

PROFESSIONAL AUDIO MIXING CONSOLE

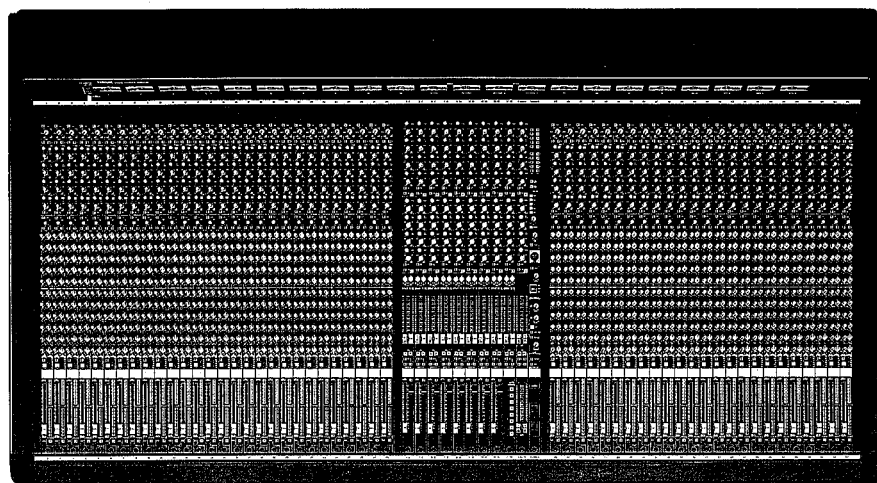
PM4000M

POWER SUPPLY for PM4000M Series

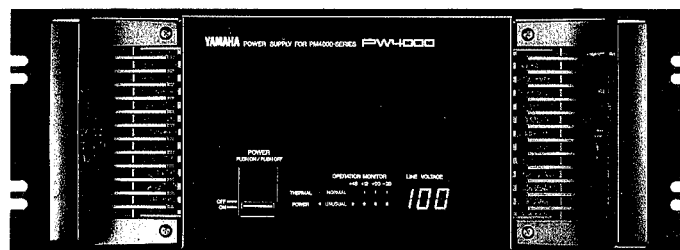
PW4000

PM4000M/PW4000

SERVICE MANUAL



PM4000M-52



PW4000

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PARTS LIST	

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IMPORTANT NOTICE

This manual has been provided for the use of authorized Yamaha Retailers and their service personnel. It has been assumed that basic service procedures inherent to the industry, and more specifically Yamaha Products, are already known and understood by the users, and have therefore not been restated.

WARNING: Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components and failure of the product to perform as specified. For these reasons, we advise all Yamaha product owners that all service required should be performed by an authorized Yamaha Retailer or the appointed service representative.

IMPORTANT: The presentation or sale of this manual to any individual or firm does not constitute authorization, certification, recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of Yamaha are continually striving to improve Yamaha products. Modifications are, therefore, inevitable and changes in specification are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

WARNING: Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

IMPORTANT: Turn the unit OFF during disassembly and parts replacement. Recheck all work before you apply power to the unit.

WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and/or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHAT SO EVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!.

If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

SPECIFICATIONS (総合仕様)

PM4000M Mixing Console: General Specifications

Total Harmonic Distortion (Group & Stereo Outputs)	<0.1% (THD+N) <0.01% (2nd – 10th harmonics)	20 Hz – 20 kHz @ +14 dBu, 600Ω 20 Hz – 20 kHz @ +14 dBu, 600Ω
Frequency Response (Group & ST Out)	0 ±1/3 dB	20 Hz – 20 kHz @ +4 dBu, 600Ω
Hum & Noise (52 Channels)* (20 Hz – 20 kHz) R _s = 150Ω Input Gain = Max. Input Pad = OFF Input Sensitivity = -70 dB *measured with a 6 dB/oct. filter @ 12.7 kHz; equivalent to a 20 kHz filter with ∞ dB/oct. attenuation.	-128 dBm	Equivalent Input Noise
	-100 dBu	Residual Output Noise
	-81 dB (85 dB S/N)	GROUP OUT Master control at nominal level, all channel mix controls at minimum level
	-80dB (84 dB S/N)	STEREO OUT Master control at nominal level, all channel mix controls at minimum level
	-54 dB (58 dB S/N)	STEREO OUT Master and one channel mix control at nominal level
Crosstalk	-80 dB @ 1 kHz, -70 dB @ 10 kHz	adjacent inputs
	-80 dB @ 1 kHz, -70 dB @ 10 kHz	input to output
Maximum Voltage Gain	90 dB	CH IN to GROUP OUT (PRE) / STEREO OUT (PRE/LVL)
	87 dB	CH IN to ST OUT (PRE/PAN)
	100 dB	CH IN to GROUP OUT (POST) / ST OUT (POST/LVL)
	97 dB	CH IN to ST OUT (POST/PAN)
	100 dB	CH IN to ST OUT (PRE/LVL) (GROUP to ST)
	74 dB	CH IN to CH DIRECT OUT
	84 dB	CH IN to CUE OUT (INPUT CUE)
	64 dB	TB IN to TB OUT
	10 dB	SUB IN to GROUP OUT / ST OUT
Channel Equalization	±15 dB maximum	HIGH 1k – 20 kHz (shelving/peaking, Q = 0.5 – 3) HI-MID 0.4 k – 8 kHz (peaking, Q = 0.5 – 3) LO-MID 80 – 1.6 kHz (peaking, Q = 0.5 – 3) LOW 30 – 600 Hz (shelving/peaking, Q = 0.5 – 3)
Channel High Pass Filter	12 dB/octave	Roll off below 20 – 400 Hz @ -3 dB points
Master Equalization	±15 dB maximum	HIGH 1k – 20 kHz (peaking, Q = 0.5 – 3) HI-MID 0.4 k – 8 kHz (peaking, Q = 0.5 – 3) LO-MID 80 – 1.6 kHz (peaking, Q = 0.5 – 3) LOW 30 – 600 Hz (peaking, Q = 0.5 – 3)
Oscillator/Noise Generator	Switchable sine wave @ 100 Hz, 1 kHz, 10 kHz or pink noise	Frequency sweepable at x0.2 to x2.0 nominal; less than 1% THD at +4 dBu
CH Preamp & EQ Peak Indicators	Red LED	Built into each input module; turns on when pre-EQ level or post-EQ level reaches 3 dB below clipping
Channel LED Meter	6 LEDs (Peak/+6/0/-6/-20 dB)	Level meter built into each input module
VU Meters (0 VU = +4 dBu output) (For 44 or 52 channel mainframes)	18 Dedicated meters, illuminated	#1–10 GROUP 1 – 10 #19 ST1 L #21 ST2 L
	4 Switchable meters, illuminated	#15–18 GROUP 15–18 #20 ST1 R #22 ST2 R
(For 36 channel mainframe; this mainframe not available in U.S.A.)	10 Dedicated meters, illuminated	#11 GROUP 11 / TB #13 GROUP 13 / CUE L #15 GROUP 15 / ST1 L #17 GROUP 17 / ST2 L
	8 Switchable meters, illuminated	#12 GROUP 12 / OSC #14 GROUP 14 / CUE R #16 GROUP 16 / ST1 R #18 GROUP 18 / ST2 R

PM4000M Mixing Console: General Specifications (Continued)

VU Meter Peak Indicators		LED (red)	Built into each VU meter, the LED turns on when the pre-line amp level reaches 3 dB below clipping
Phantom Power		+48 V dc	Available at balanced inputs (via 6.8 k Ω current limiting/isolation resistors) for powering condenser microphones; may be turned ON or OFF via rear-panel Phantom Master switch. When Master is ON, individual channels may be turned OFF or ON via +48V switches on each input module and the talkback module
Dimensions (W x H x D)	52 Channel	2086 x 346 x 1121 mm	82 ⁻¹ / ₈ x 13 ⁻⁵ / ₈ x 44 ⁻¹ / ₈ inches
	44 Channel	1846 x 346 x 1121 mm	72 ⁻¹¹ / ₁₆ x 13 ⁻⁵ / ₈ x 44 ⁻¹ / ₈ inches
	36 Channel	1586 x 346 x 1121 mm	62 ⁻³ / ₈ x 13 ⁻⁵ / ₈ x 44 ⁻¹ / ₈ inches (Not available in U.S.A.)
Weight	52 Channel	192 kg	423.3 lbs
	44 Channel	167 kg	368.2 lbs
	36 Channel	142 kg	313.1 lbs
Option	MN4000M		Monaural Input Module
	GRM4000M-1		Group Master Module 1
	GRM4000M-2		Group Master Module 2
	STM4000M		Stereo Master Module
	TB4000M		Talkback Module
	SU4000		Switching Unit
	IT4000		Input Transformer

PW4000 Power Supply Specifications

Power Requirements	Japan		32 Channel	900 W
		100 V, 50/60 Hz	52 Channel	1100 W
			44 Channel	1000 W
	CSA/UL	120 V, 60 Hz	1500 VA	1250 W
	General	230/240 V, 50/60 Hz		1250 W
DC Output Voltages			$\pm$ 19V 13 A +12V 8 A +48 V 0.7 A	
Fuses	Main (x3)		6 A	250 V
	Sub (x1)		2A	250 V
Dimensions	(W x H x D)	480.0 x 186.0 x 460.6 mm	18.8 x 7.3 x 18.1 inches	
Weight		36 kg	79.4 pounds	

SU4000 Optional Switching Unit Specifications

Power Requirements	No separate power supply; draws negligible power from the two PW4000 power supplies to which it is connected.		
Input Terminals	POWER SUPPLY (x2)		for PW4000
Output Terminals	CONSOLE (x1)		for any PM4000 series console
Indicator LEDs	PRIMARY		Green
	BACK UP		Orange
Dimensions	(W x H x D)	480.0 x 98 x 404.2 mm	18.8 x 3.8 x 15.8 inches
Weight	Switching Unit	6.2 kg	13.7 pounds
	Cables	1.0 kg	2.2 pounds
Accessories	1.2 m (3.9 foot) cable (x2)		

INPUT CHARACTERISTICS

Connection	Pad	Gain Trim	Actual Load Impedance	For Use With Nominal	Input Level ³			Connector In Console ²
					Sensitivity ⁴	Nominal	Max. Before Clip	
CH INPUT 1 ~ CH ¹	0 30 0 30	-70 -20	3K ohms if electronically balanced; 1K ohms if Xfmr bal.	50 ohm to 600 ohm mics and 600 ohm lines	-86 dBu (0.039 mV) -56 dBu (0.123 mV) -36 dBu (12.3 mV) -6 dBu (388 mV)	-70 dBu (0.25 mV) -40 dBu (7.75 mV) -20 dBu (77.5 mV) +10 dBu (2.45 V)	-48 dBu (3.09 mV) -18 dBu (97.6 mV) +2 dBu (0.975 V) +32 dBu (30.9 V)	XLR-3-31 type
SUB IN: GROUP 1 ~ 18 ST1 (L, R) ST2 (L, R) CUE (L, R)			10K ohms	600 ohm lines	-6 dBu (388 mV)	+4 dBu (1.23 V)	+26 dBu (15.5 V)	XLR-3-31 type
TALKBACK IN	-50 +4		3K ohms	50 – 600 ohm mics 600 ohm lines	-70 dBu (0.25 mV) -16 dBu (123 mV)	-50 dBu (2.45 mV) +4 dBu (1.23 V)	-28 dBu (30.9 mV) +26 dBu (15.5 V)	XLR-3-31 type
CH INSERT IN 1 ~ CH ¹			10K ohms	600 ohm lines	-12 dBu (195 mV)	+4 dBu (1.23 V)	+26 dBu (15.5 V)	Phone Jack (Tip/Ring/Sleeve)
GROUP 1~18 INSERT IN ST1 INSERT IN (L, R) ST2 INSERT IN (L, R)			10K ohms	600 ohm lines	-6 dBu (388 mV)	+4 dBu (1.23 V)	+26 dBu (15.5 V)	Phone Jack (Tip/Ring/Sleeve)

1. PM4000M – 36 = 36 Channels; –44 = 44 Channels; –52 = 52 Channels. 36 Channel version not sold in U.S.A.
2. All XLR connectors are balanced. Phone jacks are also balanced; Tip = (+), Ring = (-), Sleeve = Ground.
3. In these specifications, 0 dBu is referenced to 0.775 Vrms.
4. Sensitivity is the lowest level that will produce an output of +4 dBu (1.23V), or the nominal output level when the circuit whose sensitivity is being rated is set to maximum level.

OUTPUT CHARACTERISTICS

Connection	Actual Source Impedance	For Use With Nominal	Output Level ³		Connector In Console ²
			Nominal	Max. Before Clip	
GROUP OUT 1 ~ 18 STEREO 1 OUT L, R STEREO 2 OUT L, R CUE A & CUE B OUT 1 ~ 4 OSC OUT TALKBACK OUT	150 ohms	600 ohm lines	+4 dBu (1.23 V)	+24 dBu (12.3 V)	XLR-3-32 type
CH DIRECT OUT 1 ~ CH ¹	150 ohms	600 ohm lines	+4 dBu (1.23mV)	+24 dBu (12.3 V)	Phone Jack (T/R/S)
CH INSERT OUT: GROUP 1 ~ 18 INSERT OUT ST1 INSERT OUT L, R ST2 INSERT OUT L, R	150 ohms	10K ohm lines	+4 dBu (1.23mV)	+24 dBu (12.3 V)	Phone Jack (Tip/Ring/Sleeve)
PHONES 1, 2 OUT L, R	15 ohms	8 ohm phones 40 ohm phones	75 mW 65 mW	150 mW 150 mW	Phone Jack (T/R/S, Stereo Wired)

1. PM4000M – 36 = 36 Channels; –44 = 44 Channels; –52 = 52 Channels. 36 Channel version not sold in U.S.A.
2. All XLR connectors are balanced. Phone jacks (except for PHONES outputs) are balanced; Tip = (+), Ring = (-), Sleeve = Ground. PHONES output phone jacks are unbalanced T/R/S.
3. In these specifications, 0 dBu is referenced to 0.775 Vrms.

■ 入力仕様

Cconnection	PAD	GAIN Trim	Actual Load Impedance	For Use With Nominal	Input Level*3			Connector In Mixer*2
					Sensitivity*4	Nominal	Max.before Clip	
CH IN 1~*ch*1	0	-70	3kohms	50~600ohms Mics & 600ohms Lines	-86dB(0.039mV)	-70dB (0.25mV)	-48dB (3.09mV)	XLR-3-31type
	30				-56dB(0.123mV)	-40dB (7.75mV)	-18dB (97.6mV)	
	0	-20			-36dB (12.3mV)	-20dB (77.5mV)	+2dB (0.975V)	
	30				-6dB (388mV)	+10dB (2.45V)	+32dB (30.9V)	
GROUP 1~18 SUB IN ST1 SUB IN (L, R) ST2 SUB IN (L, R) CUE SUB IN (L, R)			10kohms	600ohms Lines	-6dB (388mV)	+4dB (1.23V)	+26dB (15.5V)	XLR-3-31type
TALKBACK IN	-50		3Kohms	50~600ohms Mics	-70dB (0.25mV)	-50dB (2.45mV)	-28dB (30.9mV)	XLR-3-31type
	+4			600ohms Lines	-16dB (123mV)	+4dB (1.23V)	+26dB (15.5V)	
CH INSERT IN 1~*ch*1			10kohms	600ohms Lines	-12dB (195mV)	+4dB (1.23V)	+26dB (15.5V)	Phones Jack (TRS)
GROUP1~18 INS IN ST1 INS IN (L, R) ST2 INS IN (L, R)			10kohms	600ohms Lines	-6dB (388mV)	+4dB (1.23V)	+26dB (15.5V)	Phones Jack (TRS)

*1 PM4000M -36;36ch, -44C;44ch, -52C;52ch

*2 全てのXLRコネクタおよびフォンジャックはバランスタイプ(T=+, R=-, S=GND)

*3 0dB=0.775Vrms

*4 規定出力レベル(+4dB=1.23V)の出力レベルを得るために必要な最小の入力レベル

■ 出力仕様

Cconnection	Actual Load Impedance	For Use With Nominal	Output Level*3		Connector In Mixer*2
			Nominal	Max.before Clip	
GROUP 1~18 OUT ST1 OUT (L, R) ST2 OUT (L, R) CUE A,B OUT (L, R) TALKBACK OUT OSC OUT	150ohms	600ohms Lines	+4dB (1.23V)	+24dB (12.3V)	XLR-3-32type
CH DIRECT OUT 1~*ch*1	150ohms	600ohms Lines		+24dB (12.3V)	Phones Jack (TRS)
CH INSERT OUT 1~*ch*1 GROUP 1~18 INSERT OUT ST1 INSERT OUT (L, R) ST2 INSERT OUT (L, R)	150ohms	10kohms Lines	+4dB (1.23V)	+24dB (12.3V)	Phones Jack (TRS)
PHONES 1,2OUT (L, R)	15ohms	8ohms Phones	75mW	150mW	Phones Jack (STEREO)
		40ohms Phones	65mW	150mW	

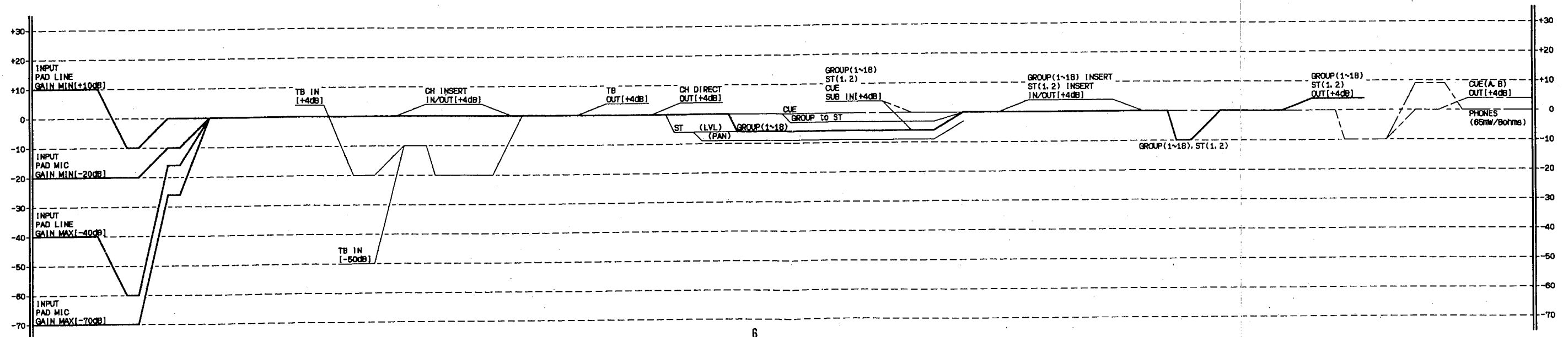
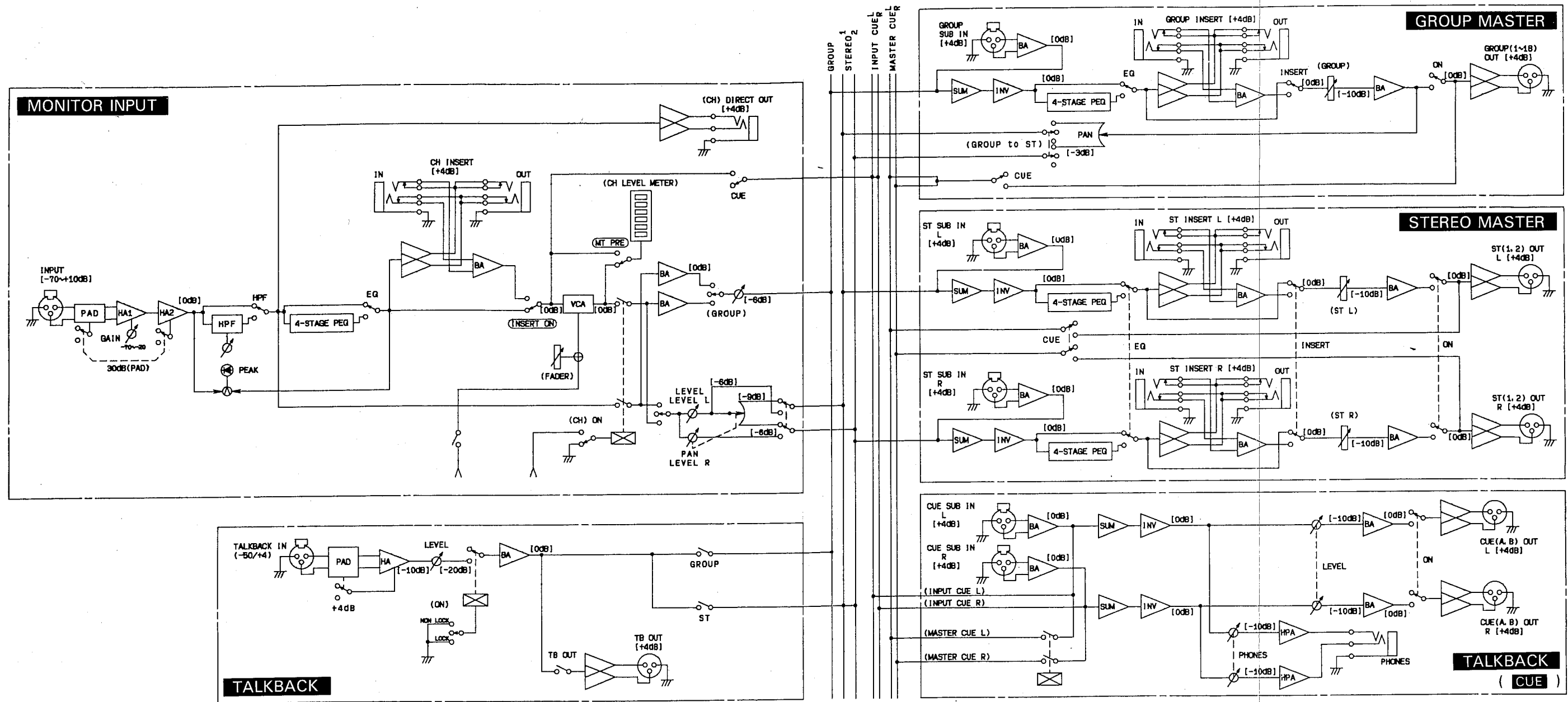
*1 PM4000M -36;36ch, -44C;44ch, -52C;52ch

*2 全てのXLRコネクタおよびフォンジャックはバランスタイプ(T=+, R=-, S=GND)

ヘッドフォンジャックはアンバランスです。

*3 0dB=0.775Vrms

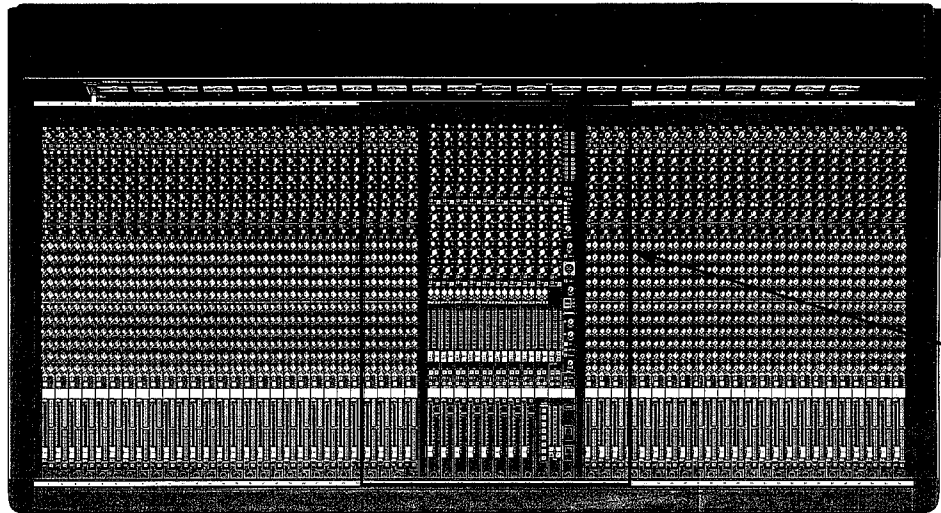
BLOCK AND LEVEL DIAGRAM (ブロック&レベルダイアグラム)



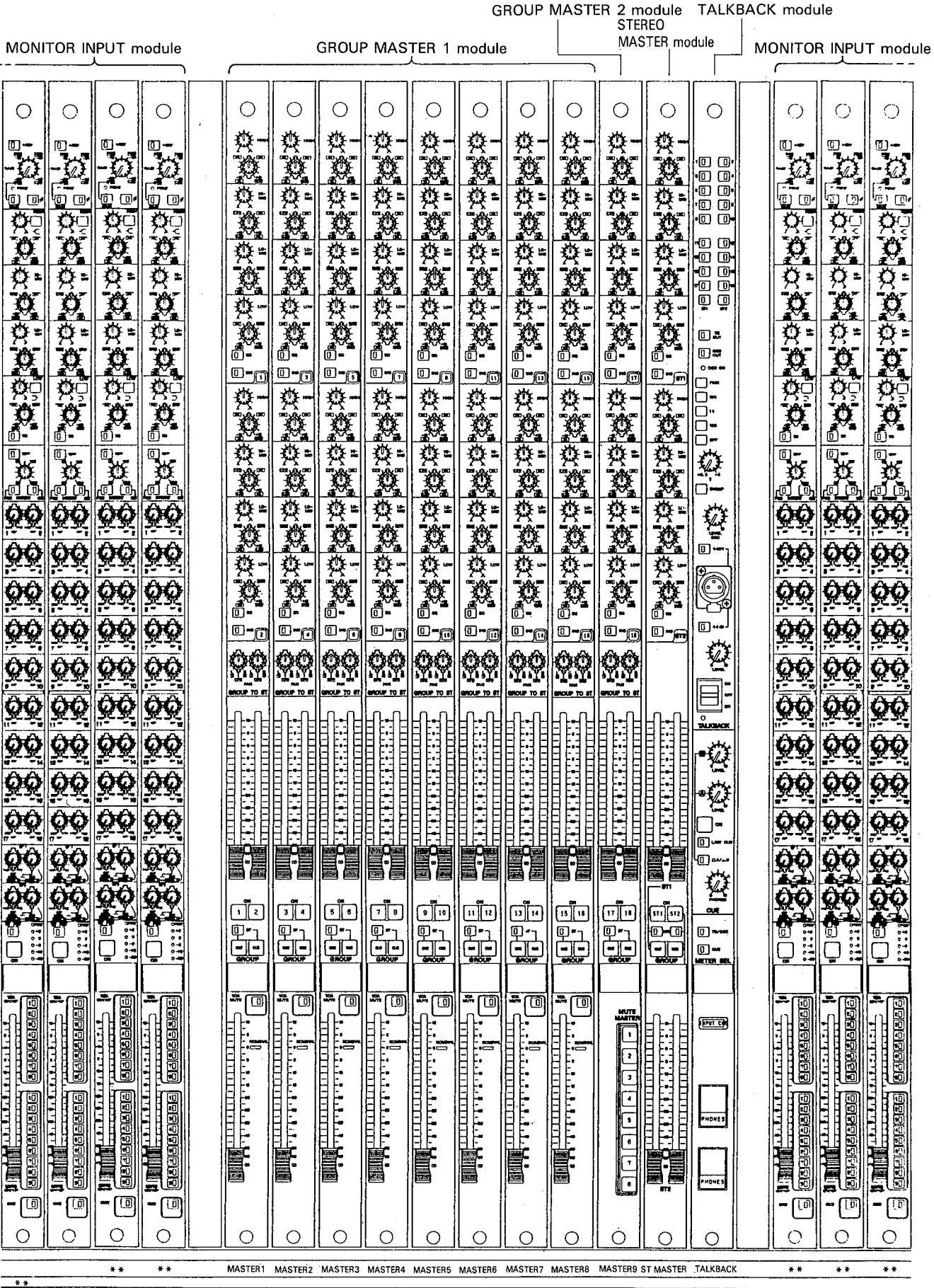
PM4000M PANEL LAYOUT (PM4000Mパネルレイアウト)

PM4000M/PW4000

• PM4000M-44/PM4000M-52

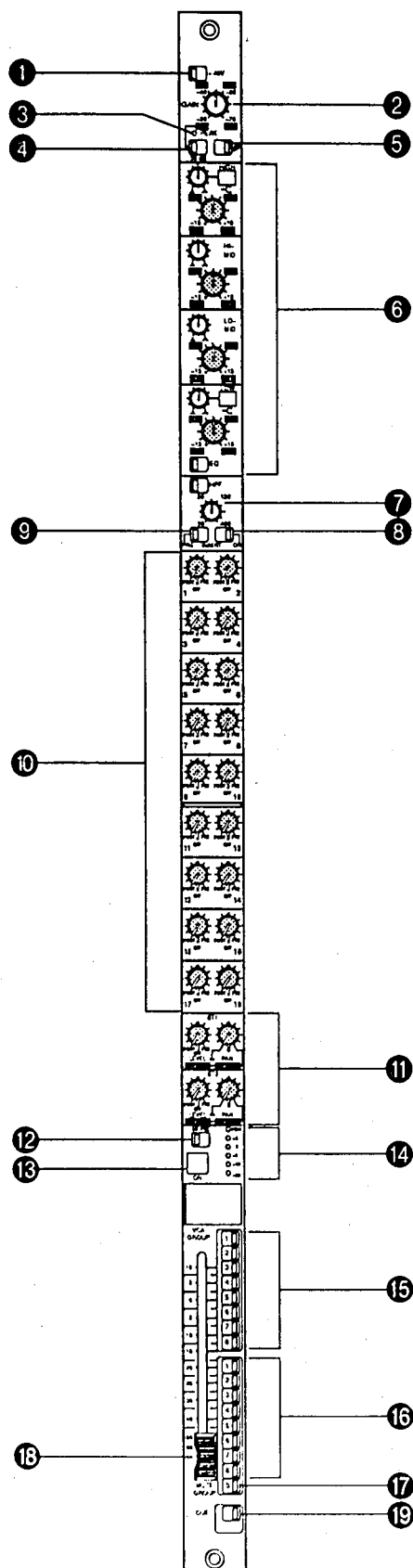


PM4000M-52



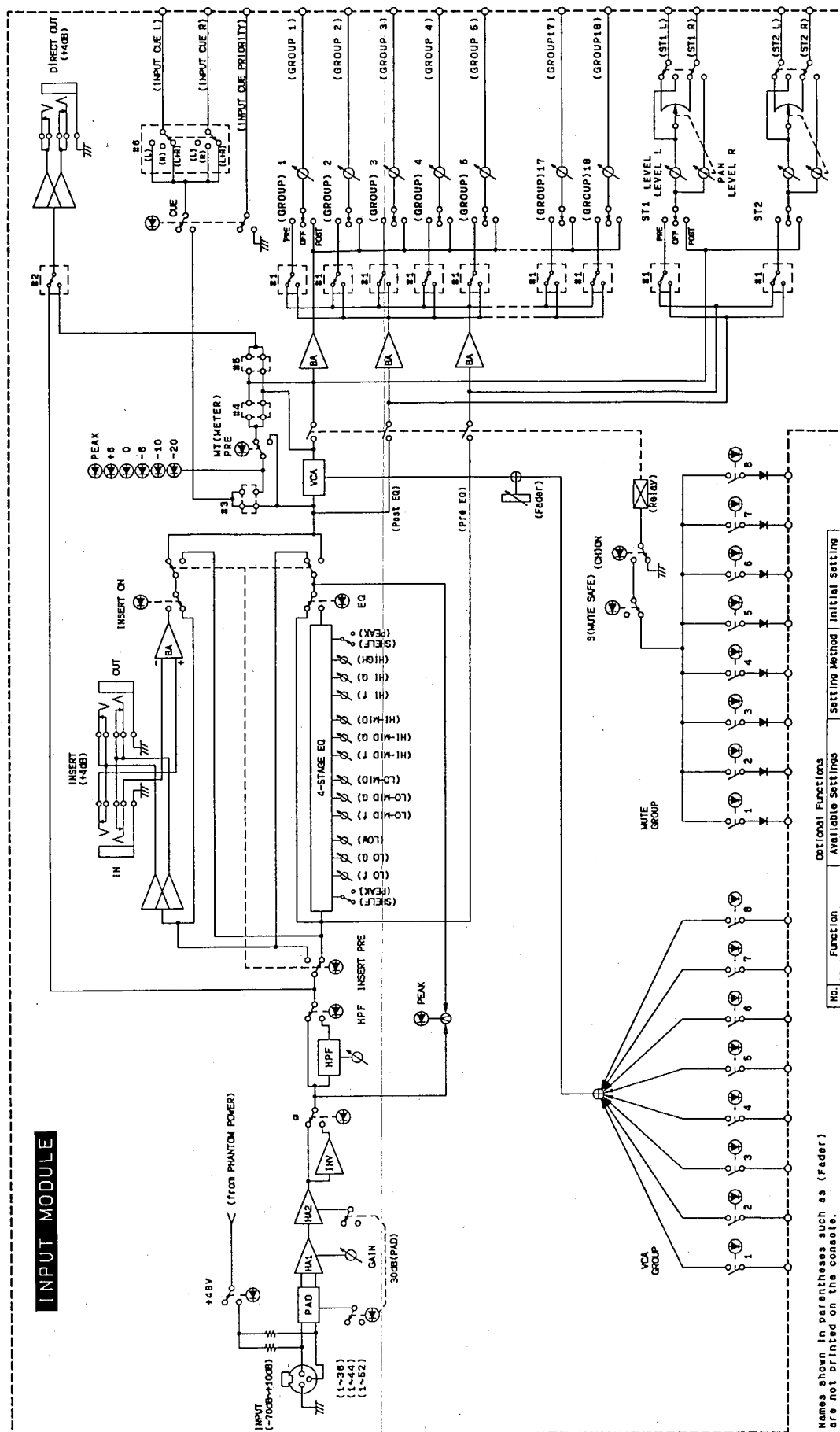
■ FRONT PANEL (フロントパネル)

● Monitor Input Module (MONITOR INPUT モジュール)



- ① +48V
- ② GAIN
- ③ PEAK
- ④ 30 dB (pad switch)
- ⑤ ϕ (Phase)
- ⑥ EQUALIZER
- ⑦ HPF (H.P. filter in/out switch and control)
- ⑧ INSERT ON
- ⑨ INSERT PRE
- ⑩ Input -to-Group Mix Assign 1 - 18
- ⑪ ST1/ST2
- ⑫ MT PRE
- ⑬ ON switch (Channel On)
- ⑭ Channel level meter
- ⑮ VCA GROUP (Assign 1 - 8)
- ⑯ MUTE (Assign 1 - 8)
- ⑰ S (Mute safe)
- ⑱ FADER
- ⑲ CUE

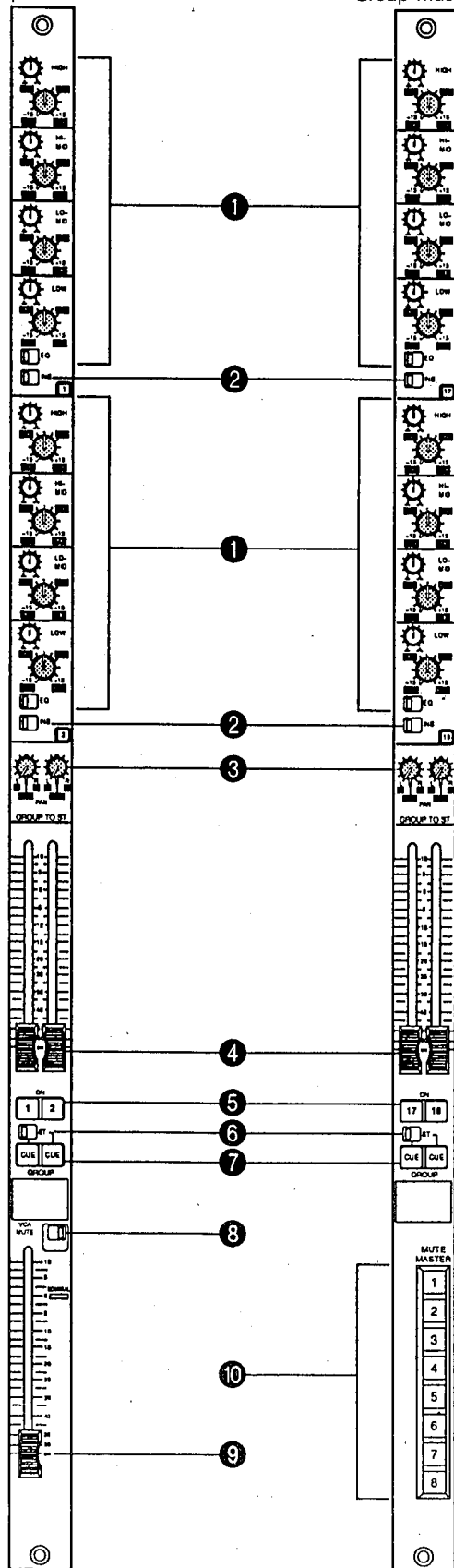
- ① +48Vスイッチ (ファントムON/OFF)
- ② GAINコントロール (入力感度)
- ③ PEAKインジケーター
- ④ 30dBスイッチ (-30dBパッドON/OFF)
- ⑤ ϕ スイッチ (位相切り替え)
- ⑥ イコライザー
- ⑦ HPFスイッチ (ハイパスフィルタON/OFF)、カットオフ周波数コントロール
- ⑧ INSERTスイッチ (INPUT INSERT INのON/OFF)
- ⑨ INSERT PREスイッチ (INPUT INSERT OUT/INの挿入位置選択 PRE/POST EQ)
- ⑩ GROUP1~18コントロール/スイッチ (GROUPバス送出レベル/PRE,OFF,POST)
- ⑪ ST1/ST2コントロール/スイッチ (STバス送出レベル)
- ⑫ MT PREスイッチ (チャンネルレベルメーターPRE/POST切り替え)
- ⑬ ONスイッチ (チャンネルON/OFF)
- ⑭ チャンネルレベルメーター
- ⑮ VCA GROUPスイッチ (VCAグループ選択)
- ⑯ MUTE GROUPスイッチ (ミュートグループ選択)
- ⑰ Sスイッチ (ミュートセーフ)
- ⑱ チャンネルフェーダー (VCAフェーダー)
- ⑲ CUEスイッチ (モニターON/OFF)



- Group Master 1 Module/Group Master 2 Module (GROUP MASTER 1とGROUP MASTER 2モジュール)
Group Master 1→MASTER1～MASTER 8, Group Master 2→MASTER 9

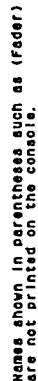
Group Master 1

Group Master 2



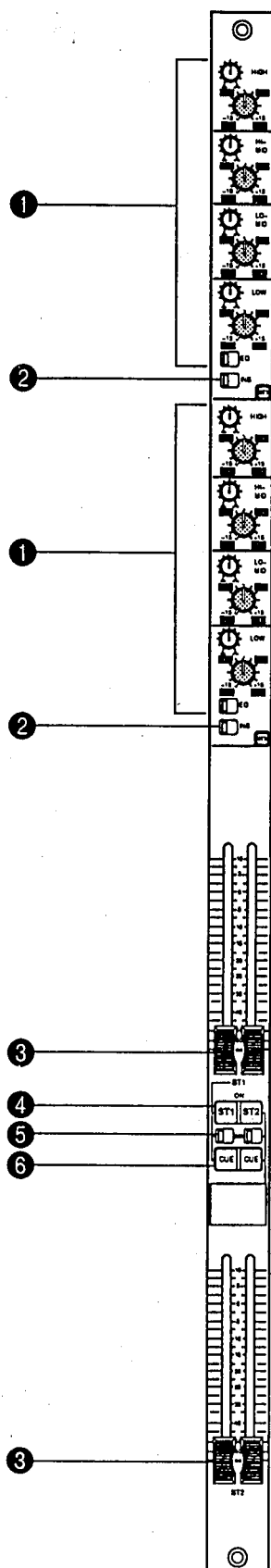
- ① GROUP EQUALIZER
- ② INSERT (ON)
- ③ GROUP TO STEREO Controls
- ④ GROUP MASTER FADERS (Group Out Faders)
- ⑤ ON (Group On)
- ⑥ ST (Stereo Group Cue)
- ⑦ CUE (Group Cue)
- ⑧ VCA MUTE
- ⑨ VCA MASTER
- ⑩ MUTE MASTER

- ① イコライザー
- ② INSスイッチ (GROUP INSERT INのON/OFF)
- ③ GROUP TO STバスコントロール/スイッチ (パンコントロール/ステレオ選択)
- ④ グループマスターフェーダー
- ⑤ ONスイッチ (グループマスターON/OFF)
- ⑥ STスイッチ (CUE STEREO/MONO切り替えスイッチ)
- ⑦ CUEスイッチ (モニターON/OFF)
- ⑧ VCA MUTE (VCAミュートスイッチ)
- ⑨ VCAマスターフェーダー
- ⑩ MUTE MASTERスイッチ (ミュートマスターON/OFFスイッチ)



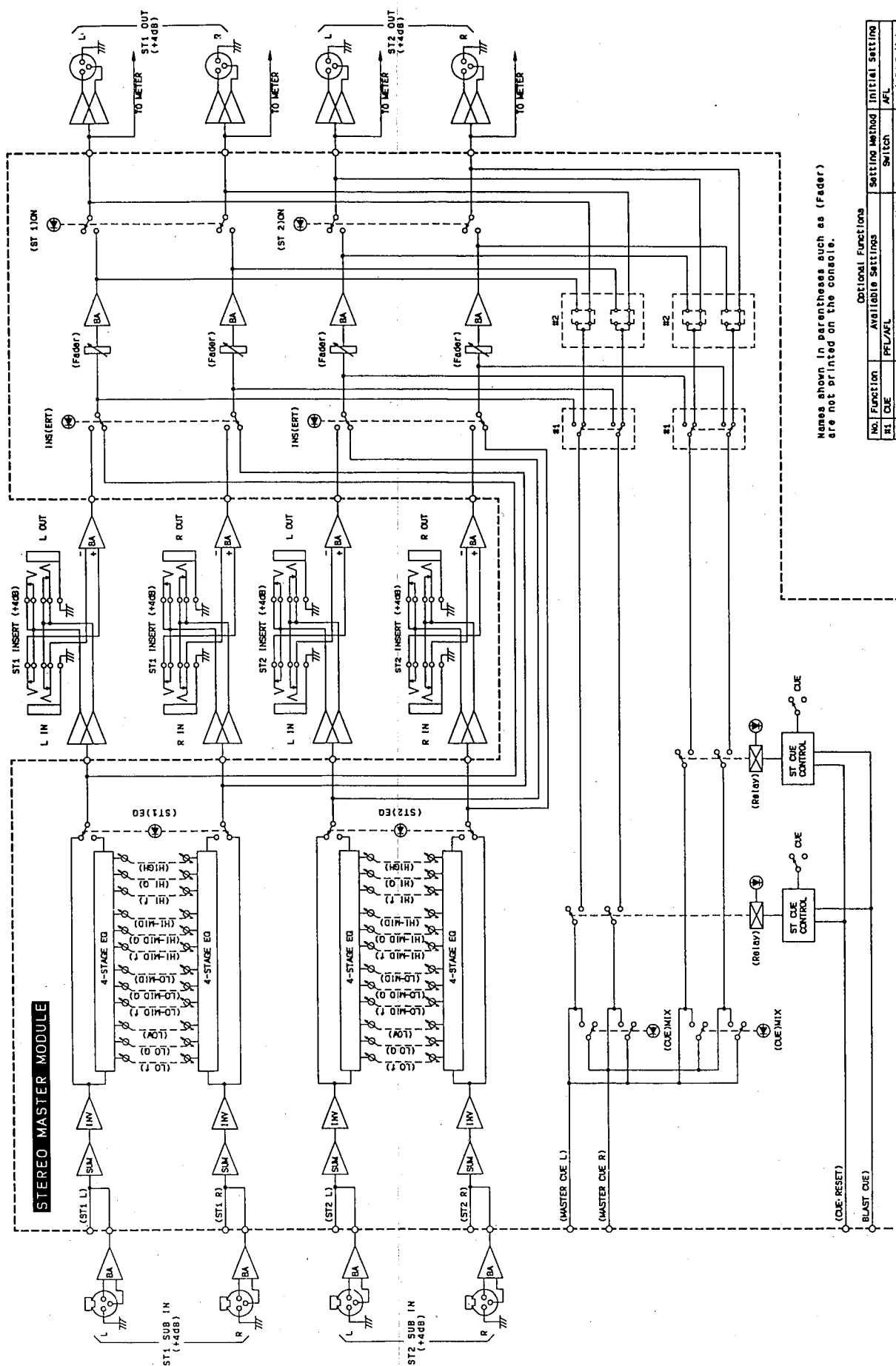
Optional Functions				
No.	Function	Available Settings	Setting Method	Initial Setting
B1	CLE	PFL/AFL	Switch	AFL
B2	CLE	to L/R/L+R	Switch	to L+R
B3	CLE/AE11	post ON SW / DISA ON SW	Jumpster	post ON Switch

● Stereo Master Module (STEREO MASTERモジュール)

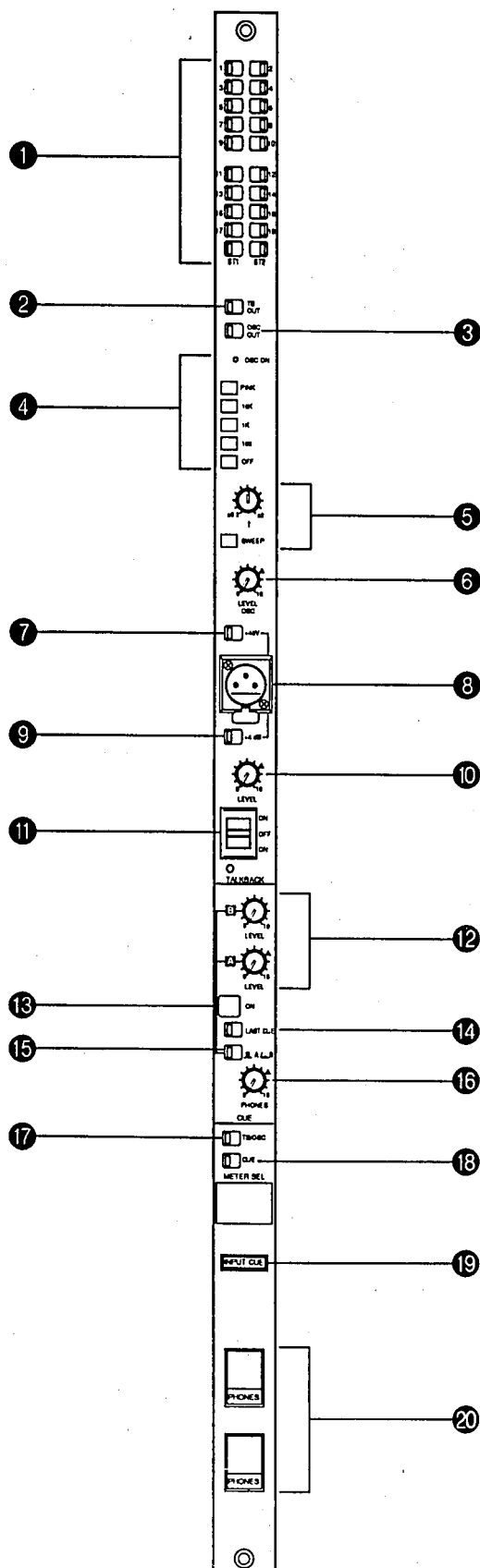


- ① STEREO EQUALIZER
- ② INSERT (ON)
- ③ STEREO MASTER FADERS
- ④ ST ON
- ⑤ MIX
- ⑥ CUE (Stereo Bus Cue)

- ① イコライザー
- ② INSスイッチ (STEREO INSERT INのON/OFF)
- ③ STEREOマスターフェーダー
- ④ ONスイッチ (ステレオマスターON/OFF)
- ⑤ MIXスイッチ (CUE STEREO/MIX切り替えスイッチ)
- ⑥ CUEスイッチ (モニターON/OFF)

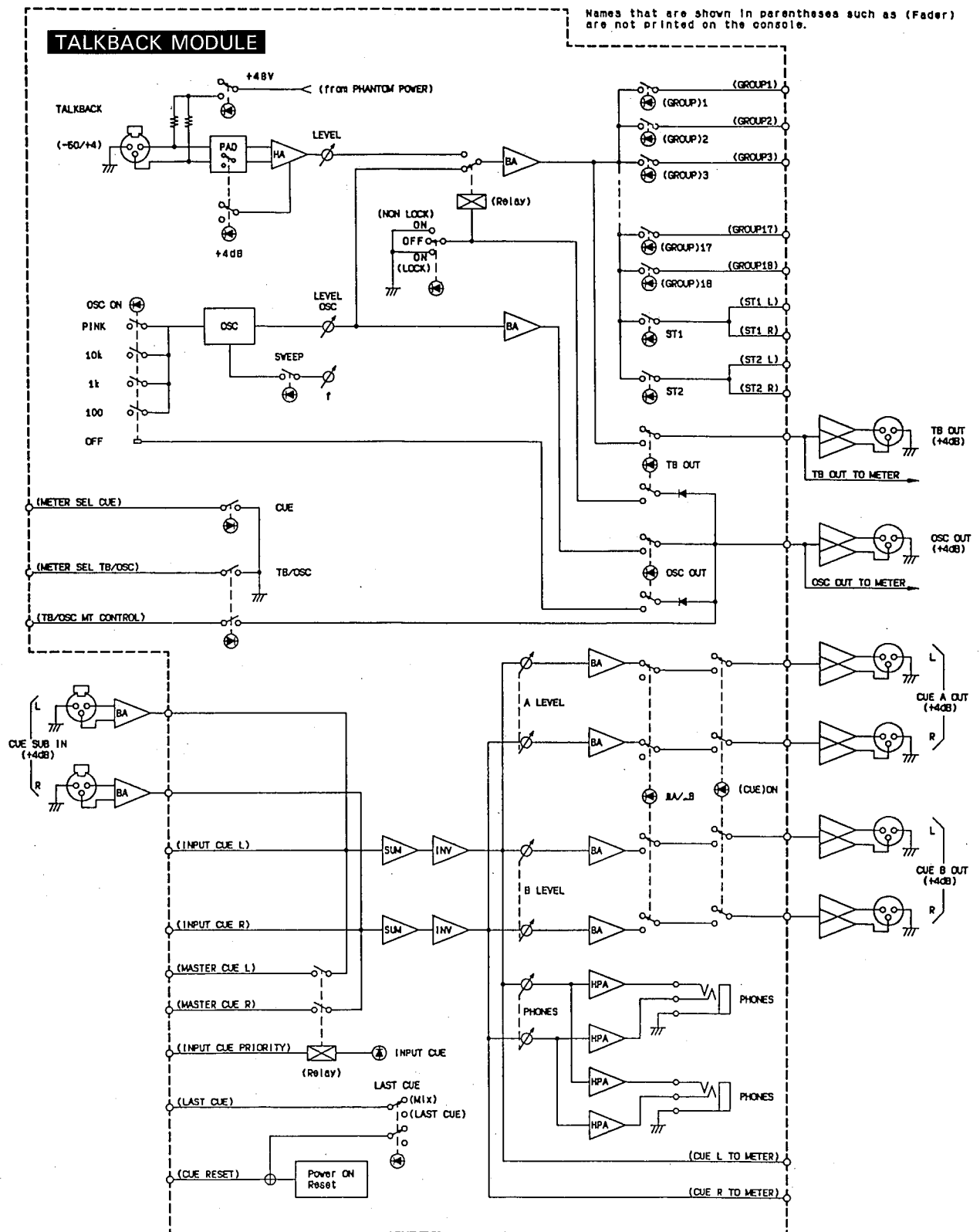


● Talkback Module (TALKBACK モジュール)



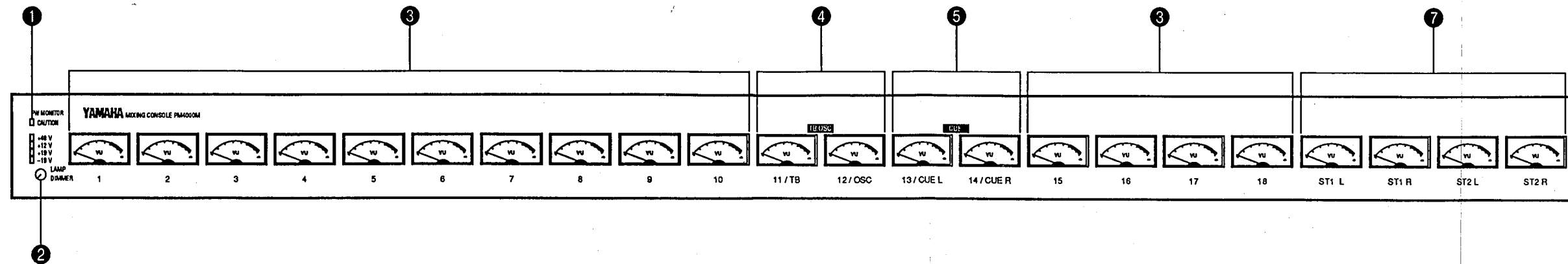
- ① 1 2 3 4 5 6 7 8.....18 (TB/OSC To Group Bus Assign), ST1 (Stereo 1) and ST2 (Stereo 2)
- ② TB OUT
- ③ OSC OUT
- ④ OSC ON, PINK•10K•1K•100•OFF
- ⑤ SWEEP (switch and rotary control)
- ⑥ LEVEL OSC
- ⑦ +48V
- ⑧ (TB INPUT)
- ⑨ +4 dB
- ⑩ LEVEL (TB input)
- ⑪ TALKBACK ON (two-way lever switch and LED indicator)
- ⑫ A & B LEVEL controls
- ⑬ ON switch (Cue On)
- ⑭ LAST CUE switch
- ⑮ A/B (Cue A or B output preselect)
- ⑯ PHONES (Level control)
- ⑰ TB/OSC (meter select switches)
- ⑱ CUE (meter select switches)
- ⑲ INPUT CUE (Indicator)
- ⑳ PHONES (Output jacks)

- ① アウトプット選択スイッチ
- ② TB OUTスイッチ (TALKBACK OUT ON/OFF)
- ③ OSC OUTスイッチ (OSC OUT ON/OFF)
- ④ OSC ON/OFFスイッチ (OSC ON/OFF/周波数選択)
- ⑤ SWEEPコントロール (SWEEP ON/OFF/周波数連続可変)
- ⑥ LEVEL OSCコントロール (発振器出力レベル)
- ⑦ +48Vスイッチ (TALKBACK INPUTファントム電源)
- ⑧ TALKBACK INPUT端子
- ⑨ +4dBスイッチ (TALKBACK INPUT入力感度切り替え)
- ⑩ LEVELコントロール (TALKBACKレベルコントロール)
- ⑪ ON/OFF/ONスイッチ (TALKBACK INPUT ON/OFF/ON)
- ⑫ A/B LEVELコントロール (CUE A/B OUTレベル)
- ⑬ ONスイッチ (CUE A/B OUT ON/OFF)
- ⑭ LAST CUEスイッチ (MASTER系CUEモード選択)
- ⑮ A/Bスイッチ (CUE A/B OUT選択スイッチ)
- ⑯ PHONESコントロール (ヘッドフォンレベル)
- ⑰ TB/OSCスイッチ (メーター選択)
- ⑱ CUEスイッチ (メーター選択)
- ⑲ INPUT CUEインジケータ
- ⑳ PHONES端子

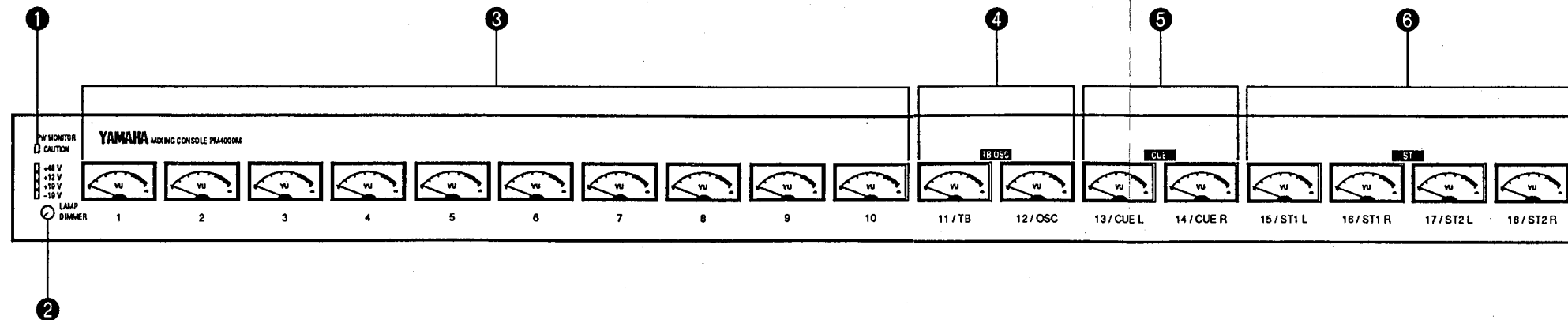


■ METER BRIDGE (メーターパネル)

● Meter Bridge for 44 or 52 Channel Mainframes (PM4000M-44, PM4000M-52 CENTER MASTERモデル)



● Meter Bridge for 36 Channel Mainframe (PM4000M-36 RIGHT MASTERモデル)

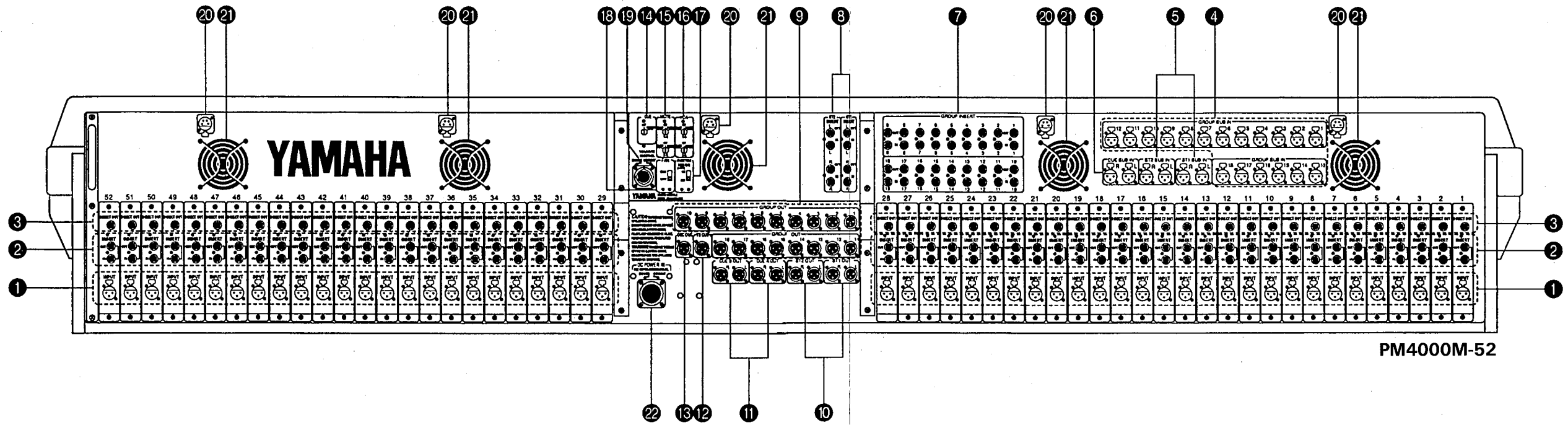


- ① PW MONITOR, +48 V, +12 V, +19 V, -19 V (Power supply indicator)
- ② LAMP DIMMER
- ③ 1, 210 (Group Bus meters) (44/52-channel models)
- ④ 11/TB, 12/OSC meters and TB/OSC indicator
- ⑤ 13/CUE L, 14/CUE R meters and CUE indicator
- ⑥ 15/ST1 L, 16/ST1 R, 17/ST2 L, 18/ST2 R meters and ST indicator (36-channel model)
- ⑦ ST1 L/R, ST2 L/R meters (44/52-channel models)

- ① PW MONITORインジケータ (PW4000電源モニター)
- ② LAMP DIMMER (ランプ調光器)
- ③ GROUP 1~10、15~18 (44/52チャンネルモデル) メーター
- ④ 11/TB、12/OSCメーター、TB/OSCインジケータ
- ⑤ 13/CUE L、14/CUE Rメーター、CUEインジケータ
- ⑥ 15/ST1 L、16/ST1 R、17/ST2 L、18/ST2 Rメーター、STインジケータ (36チャンネルモデル)
- ⑦ ST1 L/R、ST2 L/Rメーター (44/52チャンネルモデル)

REAR PANEL (リアパネル)

Rear Panel for 36 or 44 or 52 Channel (PM4000M-36, PM4000M-44, PM4000M-52 RIGHT MASTERモデル)



- ① INPUT (connector)
- ② INSERT OUT, INSERT IN (Jacks)
- ③ DIRECT OUT (Jack)
- ④ GROUP SUB IN (1 - 18)
- ⑤ ST1 SUB IN (L, R) and ST2 SUB IN (L, R)
- ⑥ CUE SUB IN (L, R)
- ⑦ GROUP INSERT 1 - 18 (IN, OUT)
- ⑧ ST1 INSERT L & R (IN, OUT), ST2 INSERT L & R (IN, OUT)
- ⑨ GROUP OUT (1 - 18)
- ⑩ ST1, OUT & ST2 OUT (L, R)
- ⑪ CUE A OUT & CUE B OUT (L, R)
- ⑫ TB OUT
- ⑬ OSC OUT
- ⑭ CUE Connect/Off MASTER
- ⑮ MUTE: SLAVE/OFF/MASTER (1-4, 5-8)
- ⑯ VCA: SLAVE/OFF/MASTER (1-4, 5-8)
- ⑰ PHANTOM MASTER (+48V)
- ⑱ FAN (speed switch)
- ⑲ VCA/MUTE CONTROL
- ⑳ LAMP (4-pin XLR connector)
- ㉑ Cooling Fan
- ㉒ DC POWER INPUT

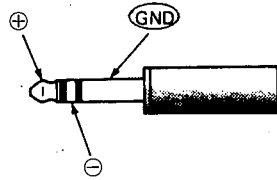
- ① INPUTコネクター
- ② INSERT IN/OUTジャック
- ③ DIRECT OUTジャック
- ④ GROUP SUB INコネクター
- ⑤ ST1/2 SUB INコネクター
- ⑥ CUE SUB INコネクター
- ⑦ GROUP INSERTジャック
- ⑧ ST1/2 INSERTジャック
- ⑨ GROUP OUTコネクター
- ⑩ ST1/2 OUTコネクター
- ⑪ CUE A/B OUTコネクター
- ⑫ TB OUTコネクター
- ⑬ OSC OUTコネクター
- ⑭ CUEコントロールスイッチ
- ⑮ MUTEコントロールスイッチ
- ⑯ VCAコントロールスイッチ
- ⑰ PHANTOM MASTERスイッチ
- ⑱ FAN HIGH/LOWスイッチ
- ⑲ VCA/MUTE CONTROLコネクター
- ⑳ LAMP (ランプ) コネクター
- ㉑ 冷却ファン
- ㉒ DC POWER INPUTコネクター

All XLR connectors and phone jacks are balanced.

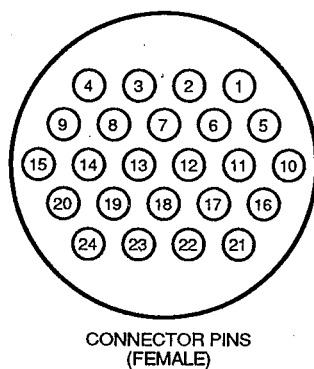
(キャノンおよびホンジャックの入出力端子は、全て電子バランス方式になっています。)

XLR	phone jack	signal
pin 1	S	GND
pin 2	T	+ (hot)
pin 3	R	- (cold)

1/4" phone plug (#110ホンプラグ)

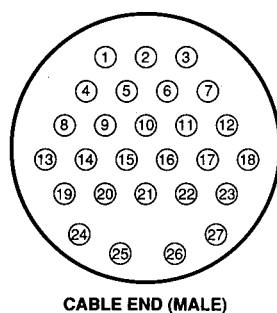


● VCA/MUTE Connector Pin Assignments (VCA/MUTE コネクターのピン配列)



PIN N°	FUNCTION	PIN N°	FUNCTION
1	VCA EXT 1	13	MUTE EXT 3
2	VCA EXT 2	14	MUTE EXT 4
3	VCA EXT 3	15	MUTE EXT 5
4	VCA EXT 4	16	MUTE EXT 6
5	VCA EXT 5	17	MUTE EXT 7
6	VCA EXT 6	18	MUTE EXT 8
7	VCA EXT 7	19	GND
8	VCA EXT 8	20	GND
9	GND	21	GND
10	NC	22	INPUT CUE EXT
11	MUTE EXT 1	23	NC
12	MUTE EXT 2	24	NC

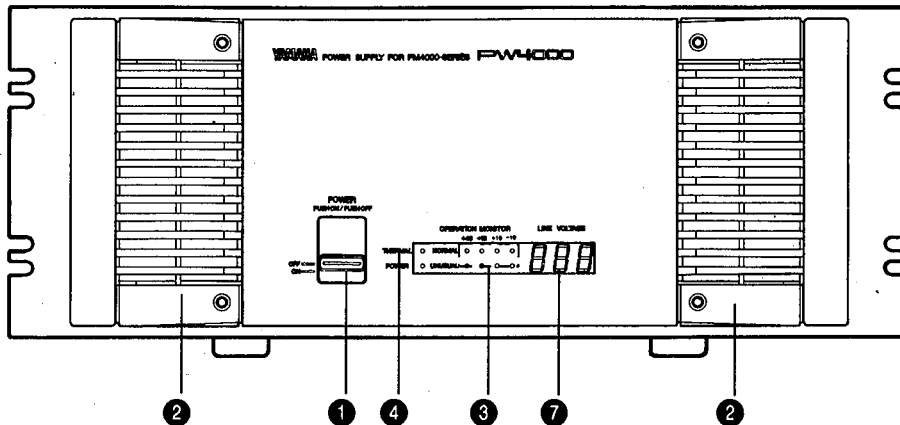
● DC POWER INPUT Connector Pin Assignments (DC POWER INPUTのピン配列)



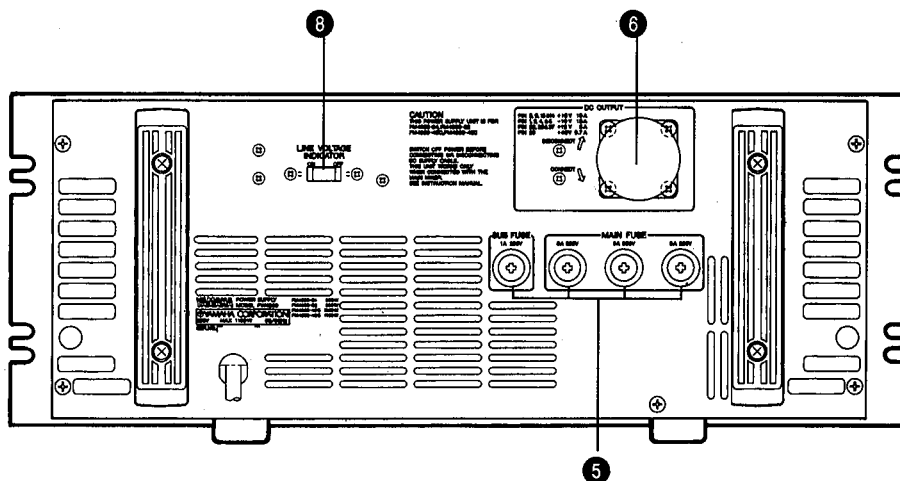
PIN N°	FUNCTION	PIN N°	FUNCTION
1	-19V	15	±19V GND
2	-19V	16	±19V GND
3	FRAME GND	17	+12V GND
4	-19V	18	+12V GND
5	-19V	19	PM CAUTION (+)
6	FRAME GND	20	+48V
7	FRAME GND	21	+48V GND
8	+19V	22	+12V
9	+19V	23	+12V
10	±19V GND	24	PW CAUTION (-)
11	±19V GND	25	REMOTE
12	+12V GND	26	REMOTE
13	+19V	27	+12V
14	+19V		

■ PW4000 PANEL LAYOUT (PW4000パネルレイアウト)

● Front Panel (フロントパネル)



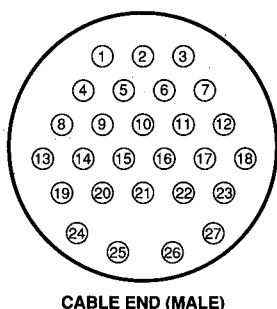
● Rear Panel (リアパネル)



- ① POWER
- ② Grille
- ③ Operation Monitor
- ④ THERMAL (Indicator)
- ⑤ FUSES
- ⑥ DC OUTPUT (Umbilical Connector)
- ⑦ LINE VOLTAGE (LED Display)
- ⑧ LINE VOLTAGE INDICATOR (Switch)

- ① POWER ON/OFFスイッチ
- ② ファン用グリル
- ③ オペレーションモニター
- ④ THERMALインジケータ
- ⑤ 電源ヒューズ
- ⑥ DC OUTPUTコネクタ
- ⑦ LINE VOLTAGE表示器
- ⑧ LINE VOLTAGE (SW)

● Umbilical Connector Pin Assignments (電源ケーブルのピン配列)

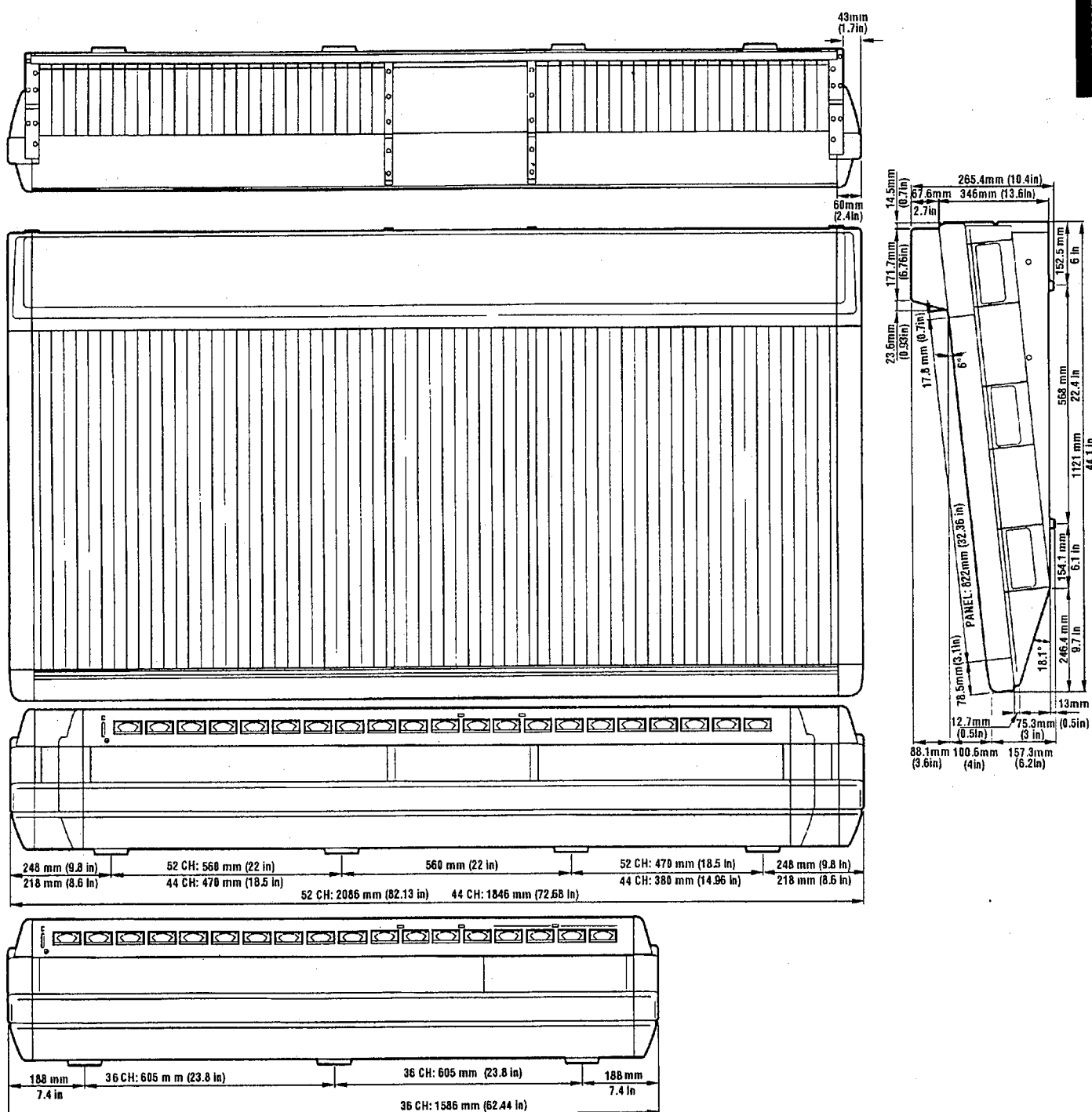


CABLE END (MALE)

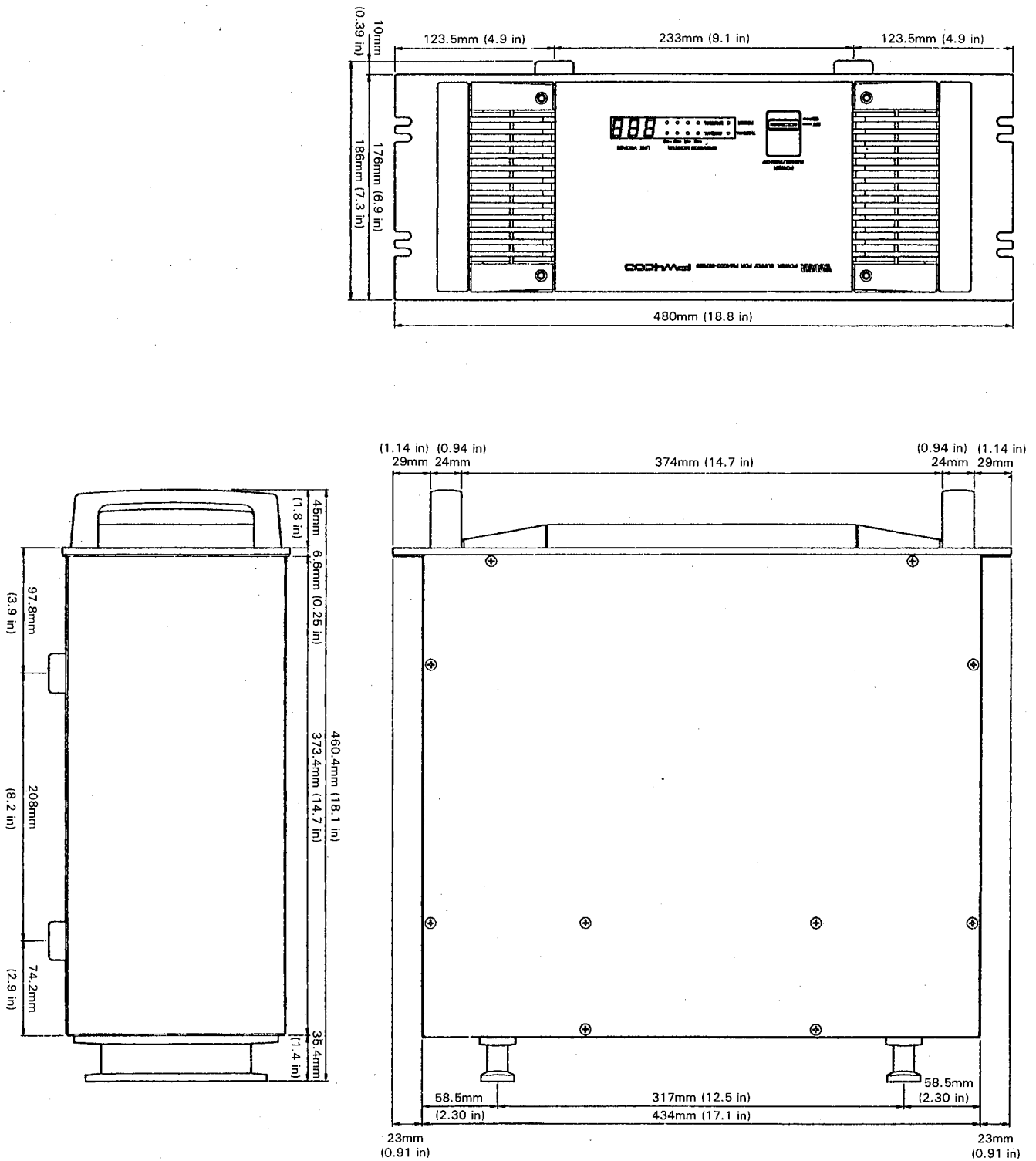
PIN N°	FUNCTION	PIN N°	FUNCTION
1	-19V	15	±19V GND
2	-19V	16	±19V GND
3	FRAME GND	17	+12V GND
4	-19V	18	+12V GND
5	-19V	19	PM CAUTION (+)
6	FRAME GND	20	+48V
7	FRAME GND	21	+48V GND
8	+19V	22	+12V
9	+19V	23	+12V
10	±19V GND	24	PW CAUTION (-)
11	±19V GND	25	REMOTE
12	+12V GND	26	REMOTE
13	+19V	27	+12V
14	+19V		

PM4000M DIMENSIONS (PM4000M寸法図)

PM4000M/PW4000

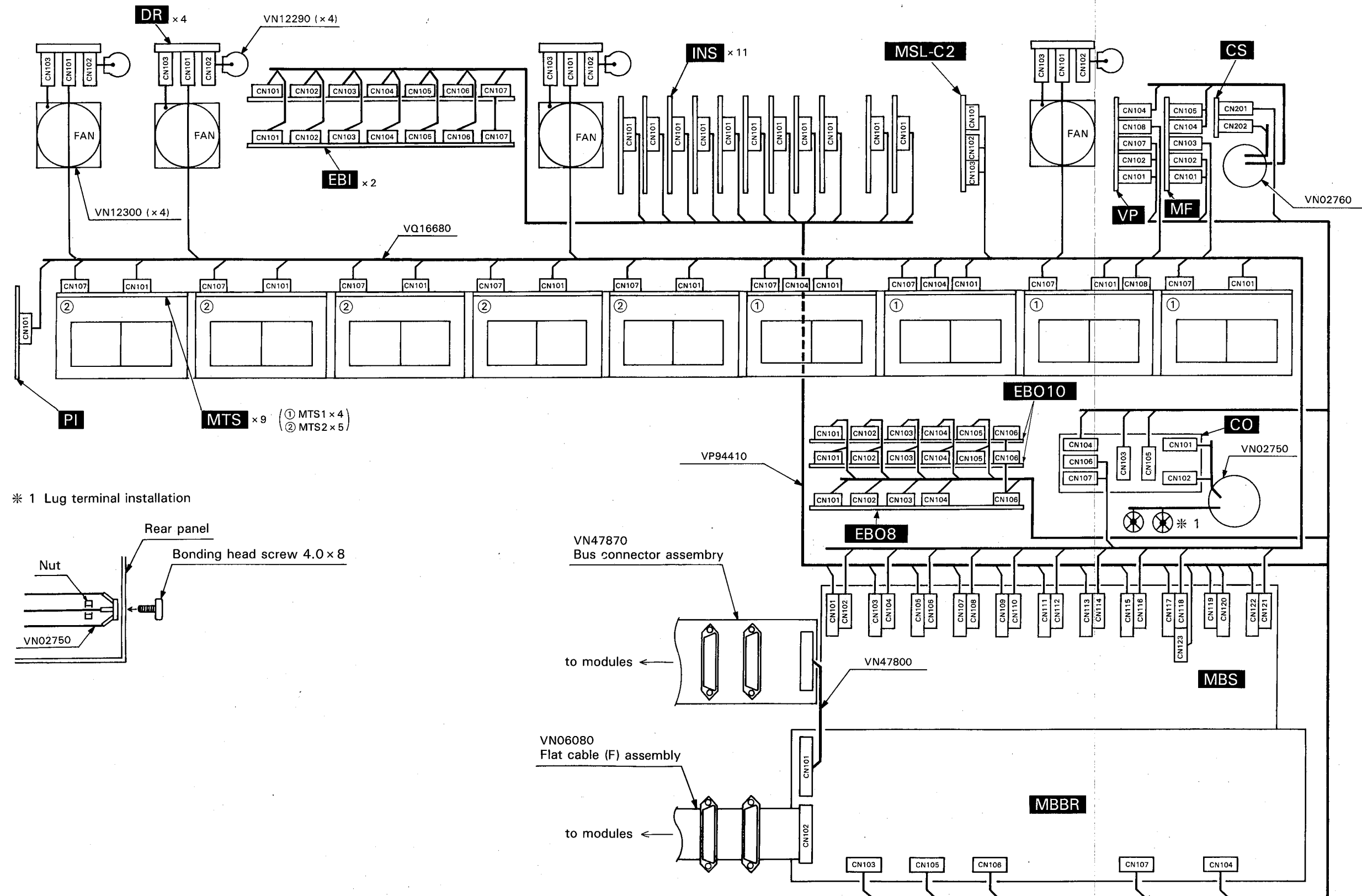


■ PW4000 DIMENSIONS (PW4000寸法図)

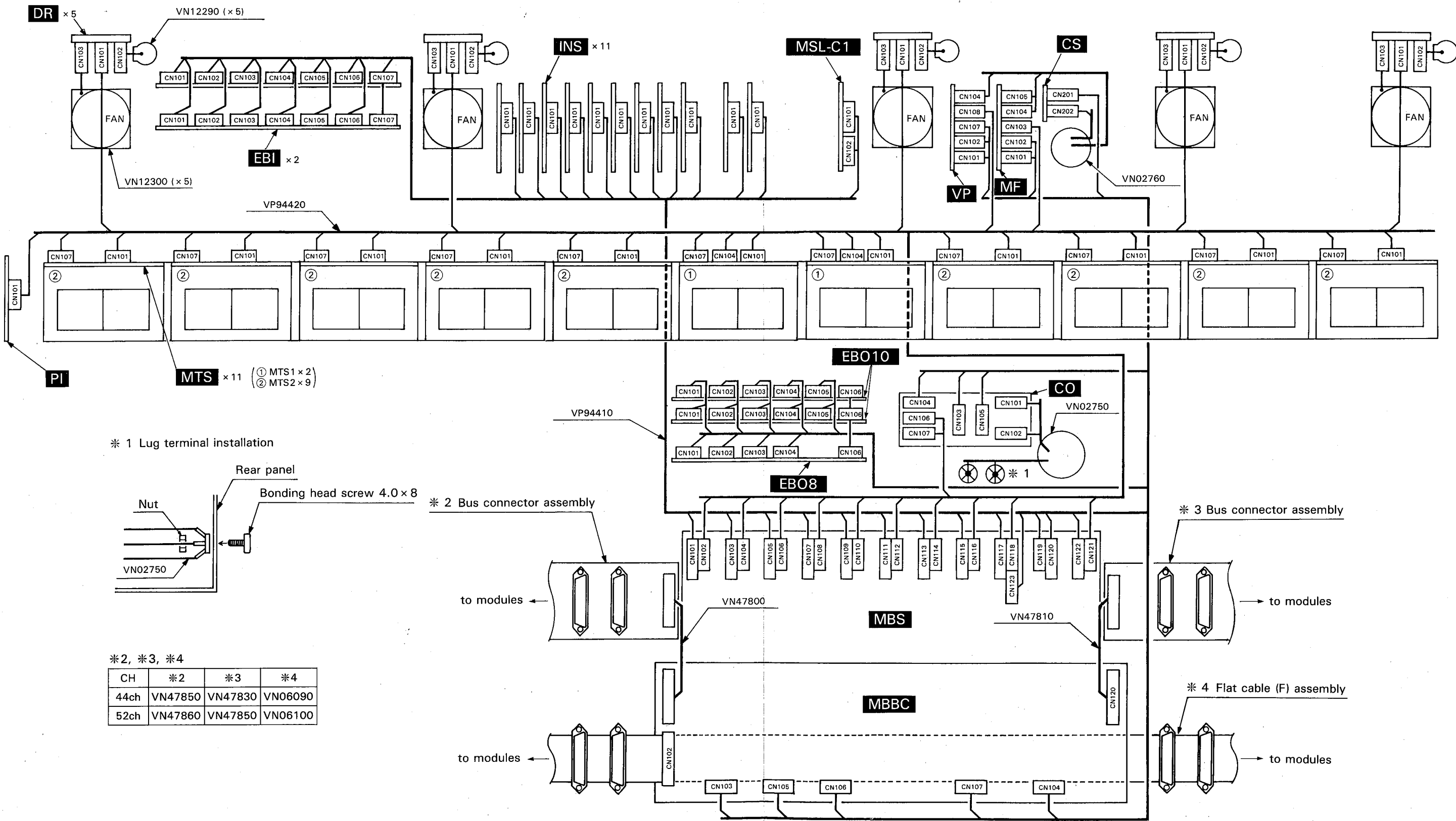


■ CIRCUIT BOARD WIRING (基板結線図)

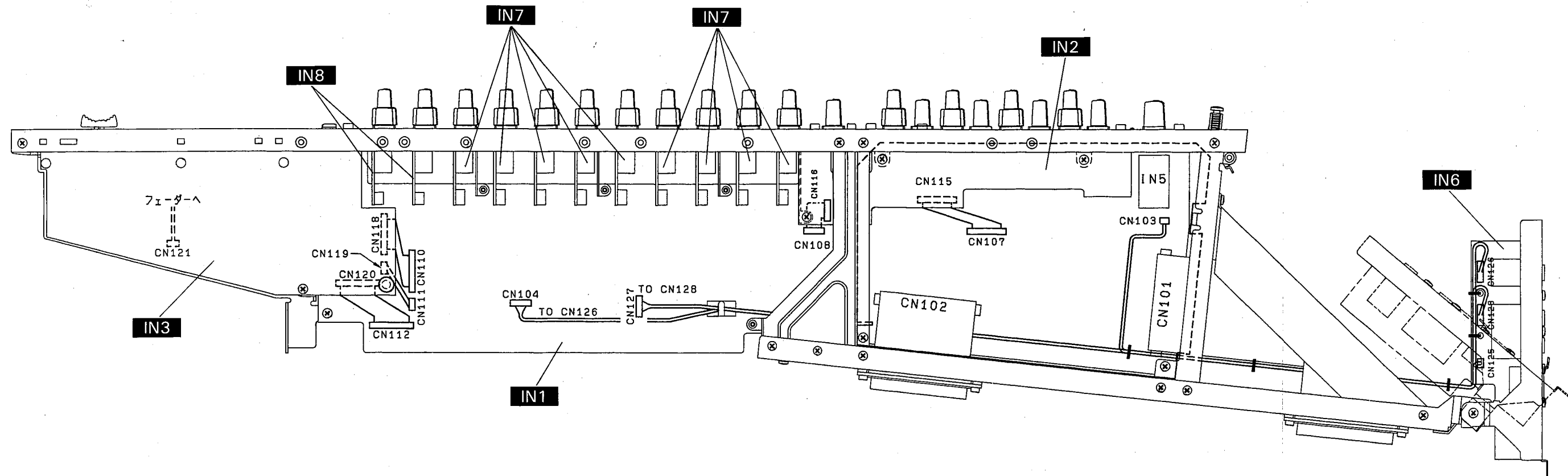
● PM4000M-36C Overall Assembly (総組立)



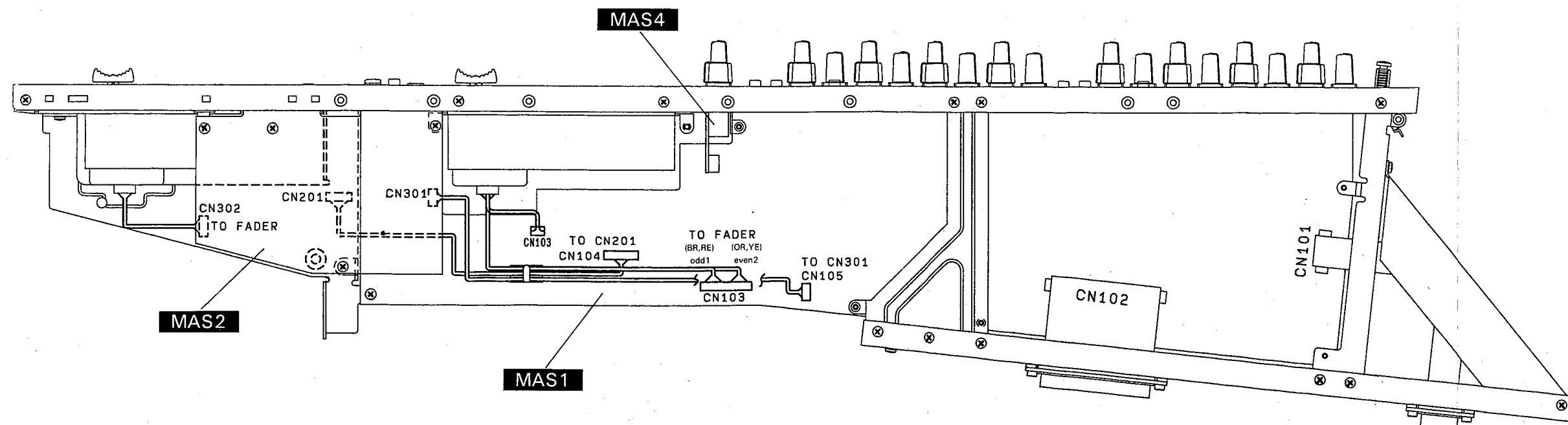
● PM4000-M-44C, PM4000M-52C Overall Assembly (総組立)



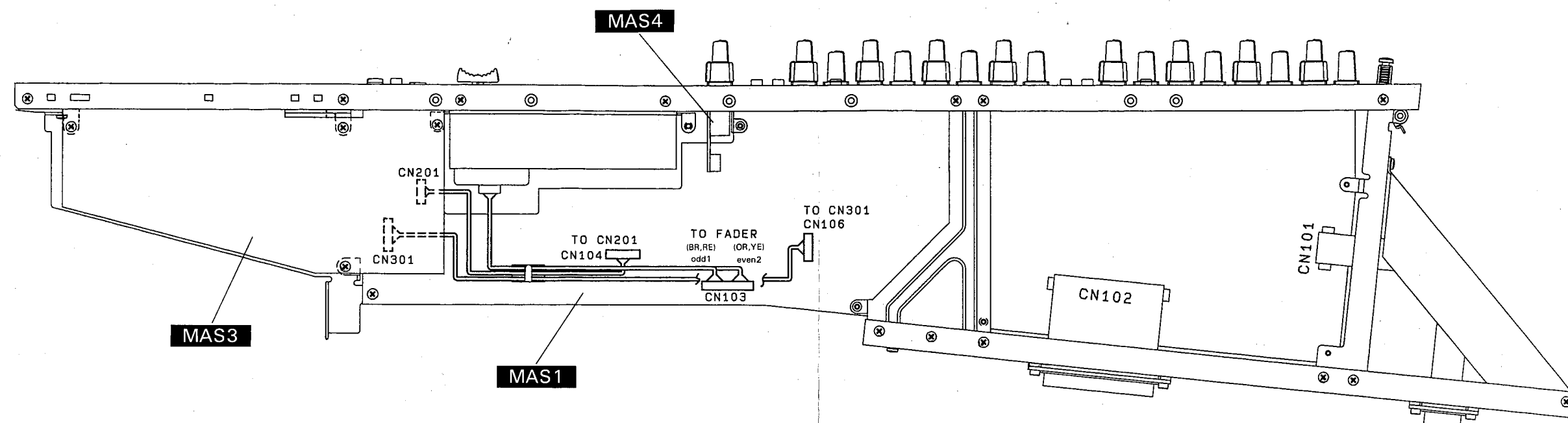
● Monitor Input Module (MONITOR INPUT モジュール)



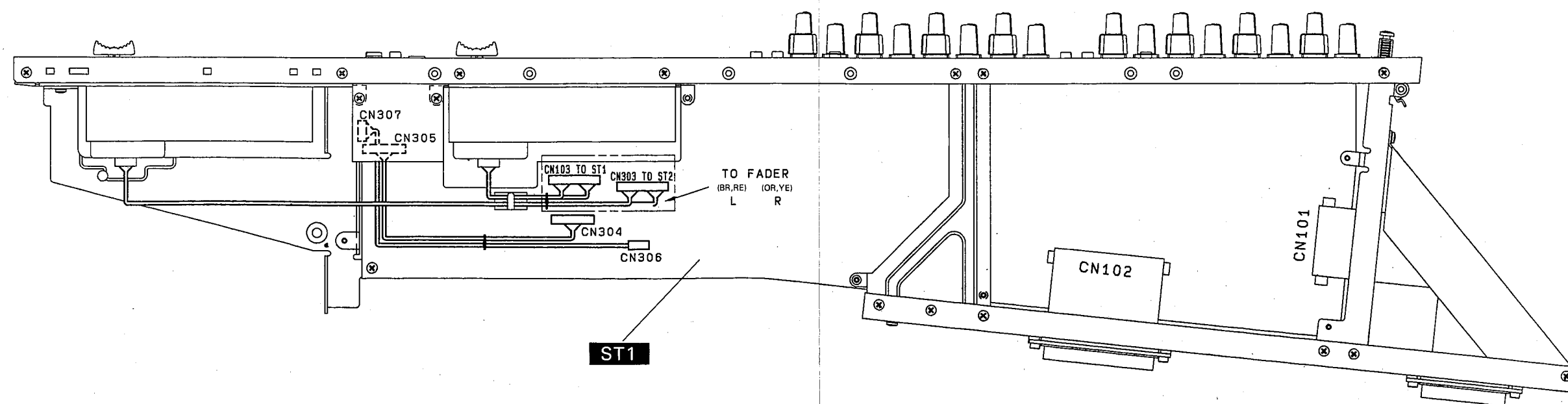
● **Group Master 1 Module (GROUP MASTER1モジュール)**



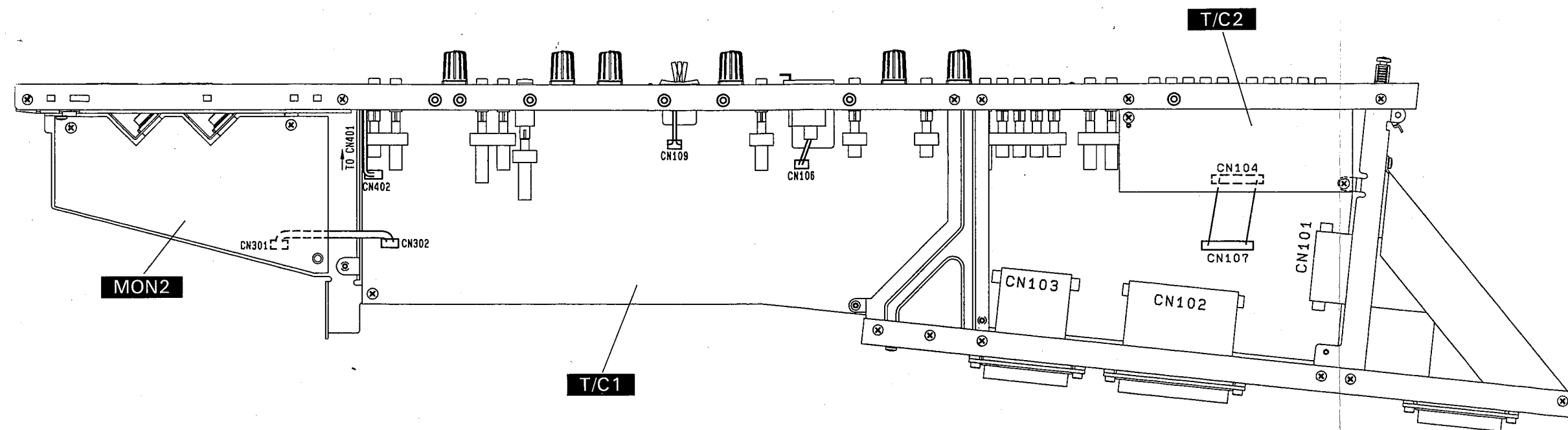
● Group Master 2 Module (GROUP MASTER 2モジュール)



● Stereo Master Module (STEREO MASTERモジュール)



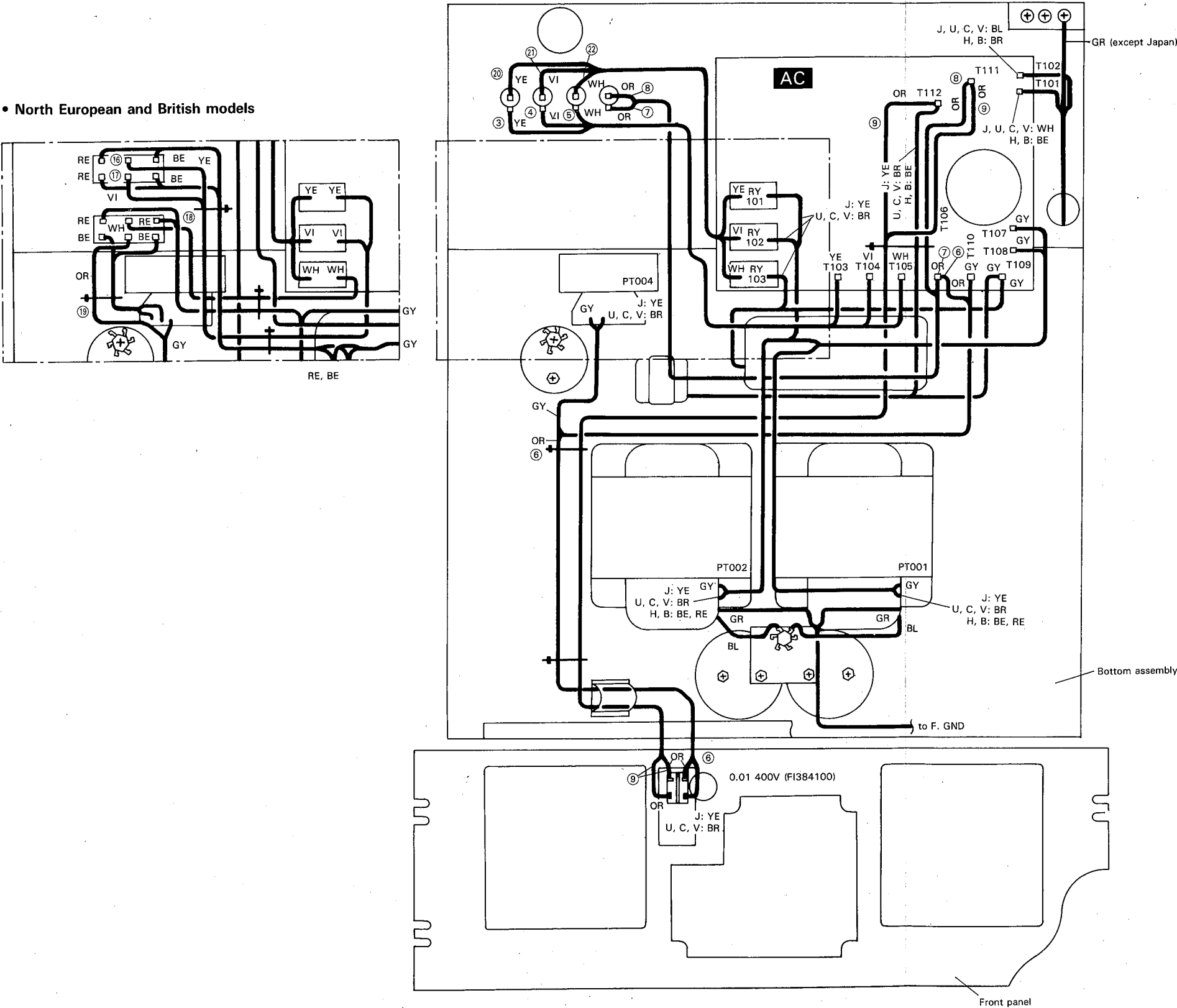
● Talkback Module (TALKBACKモジュール)



● PW4000 Overall Assembly — Primary (PW4000総組立-1次配線)

● Japanese, U.S. and Canadian models

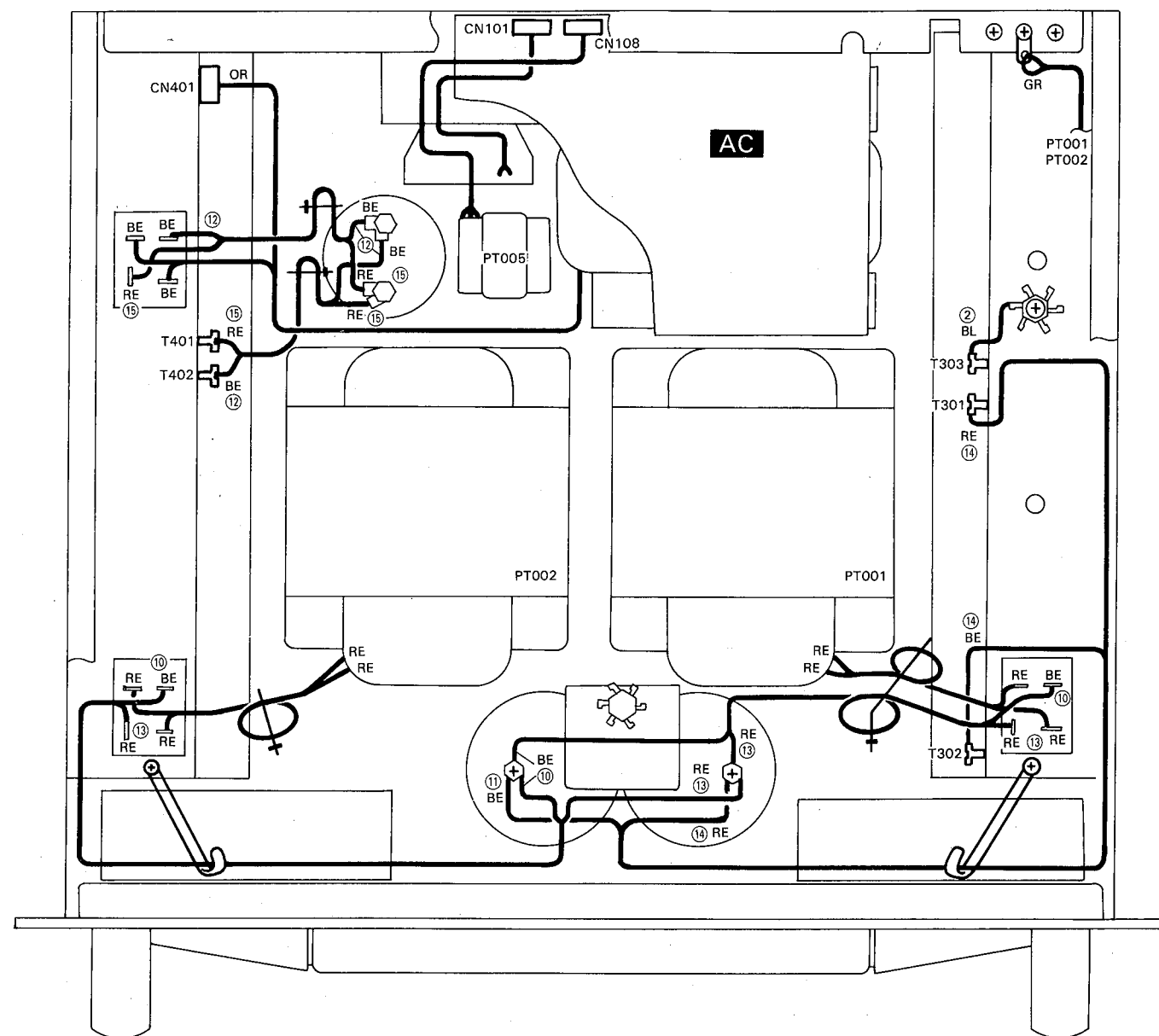
● North European and British models



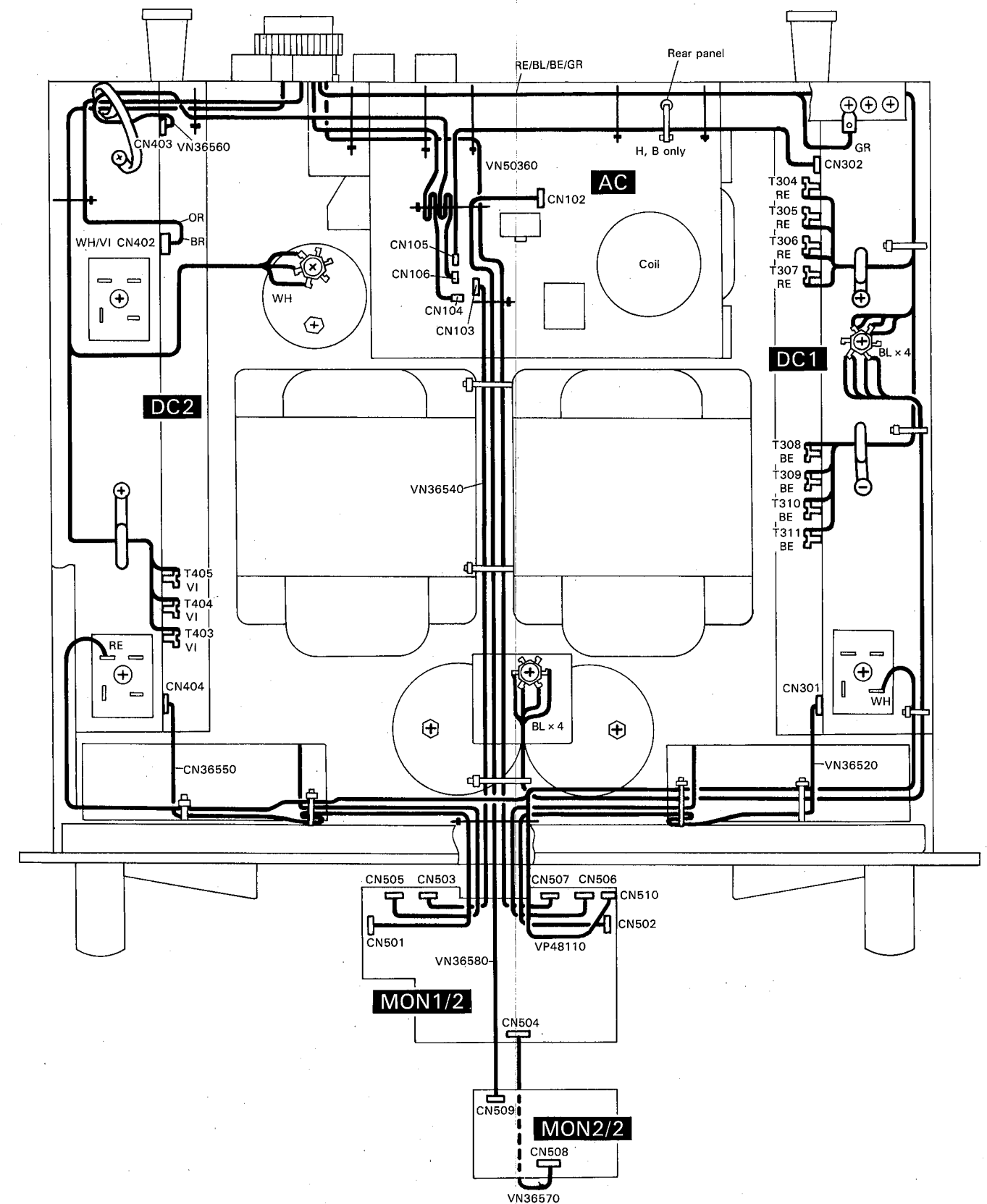
NO.	DESTINATION		LENGTH	WIRE COLOR	PART NO.
②	DC1	Right side P.T. plate	L = 50	BL	VA16590
③	T103	F001	L = 290	YE	VA16500
④	T104	F002	L = 290	VI	VA16530
⑤	T105	F003	L = 390	WH	VA16550
⑥	T106	SW001	L = 520	OR	VA16490
⑦	T106	F004	L = 370	OR	VA16490
⑧	F004	T111	L = 480	OR	VA16490
⑨	T111, T112	SW001	L = 630	OR	VA16490
⑩	68000μF	DC4	L = 420	BE	VA16100
⑪	68000μF	DC1	L = 440	BE	VA16100
⑫	10000μF, DC2	DC4	L = 160	BE	VA16100
⑬	68000μF	DC4	L = 420	RE	VA16060
⑭	68000μF	DC1	L = 540	RE	VA16060
⑮	10000μF, DC2	DC4	L = 160	RE	VA16060
⑯	RY 101	SW002	L = 330	YE	VA16500
⑰	RY 102	SW002	L = 330	VI	VA16530
⑱	RY 103	SW003	L = 330	WH	VA16550
⑲	SW001	SW003	L = 520	OR	VA16490
⑳	RY 101	F001	L = 200	YE	VA16500
㉑	RY 102	F002	L = 200	VI	VA16530
㉒	RY 103	F003	L = 200	WH	VA16550
㉓	Right side P.T. plate	Electrolytic capacitor	L = 510	BL	VA16590

※ Wires listed above are not available as service parts.
(上記の束線は、補修用部品としては用意されていません。)

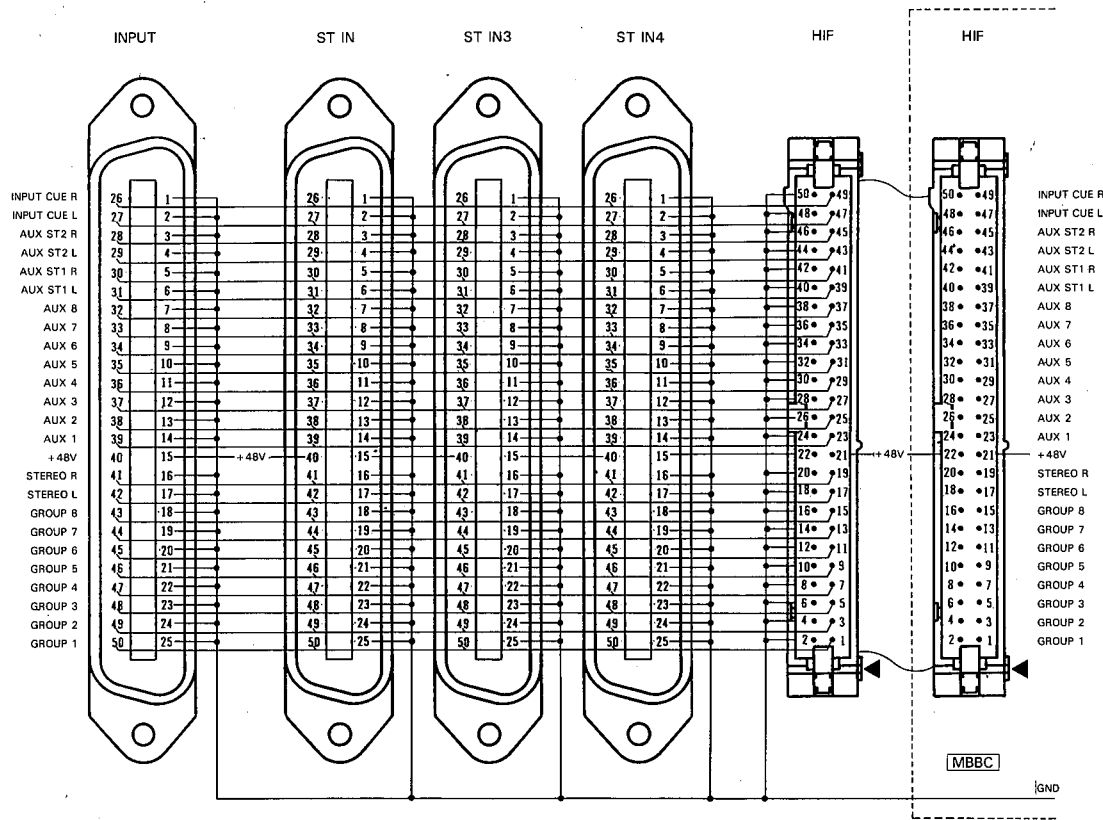
● PW4000 Overall Assembly — Secondary (PW4000総組立-2次配線)



● PW4000 Overall Assembly — Connectors (PW4000総組立-コネクタ配線)

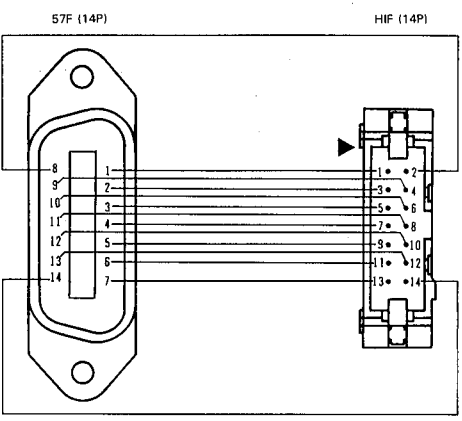
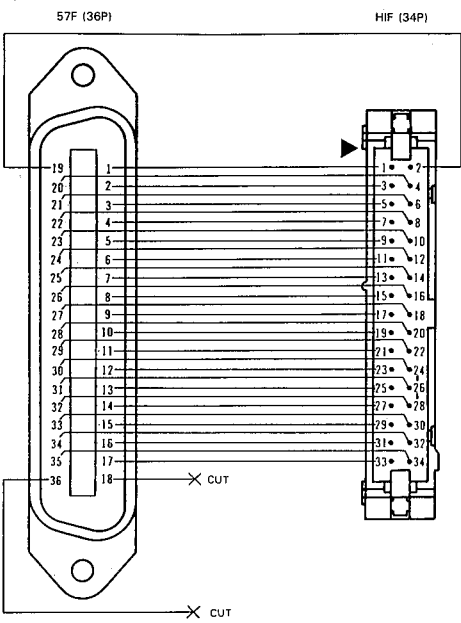
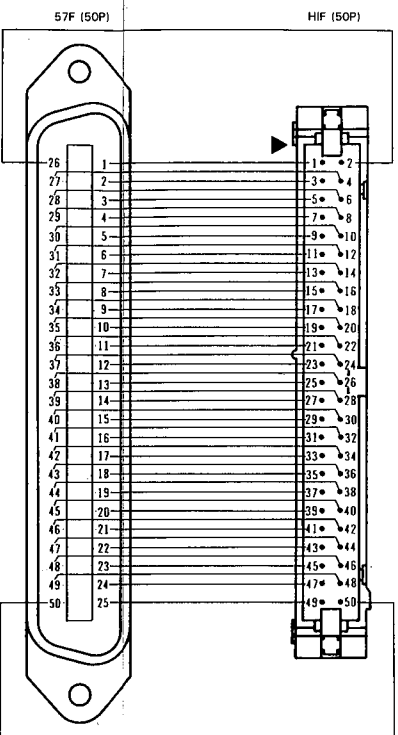


● SIGNAL bus connector (rear side) pin assignments

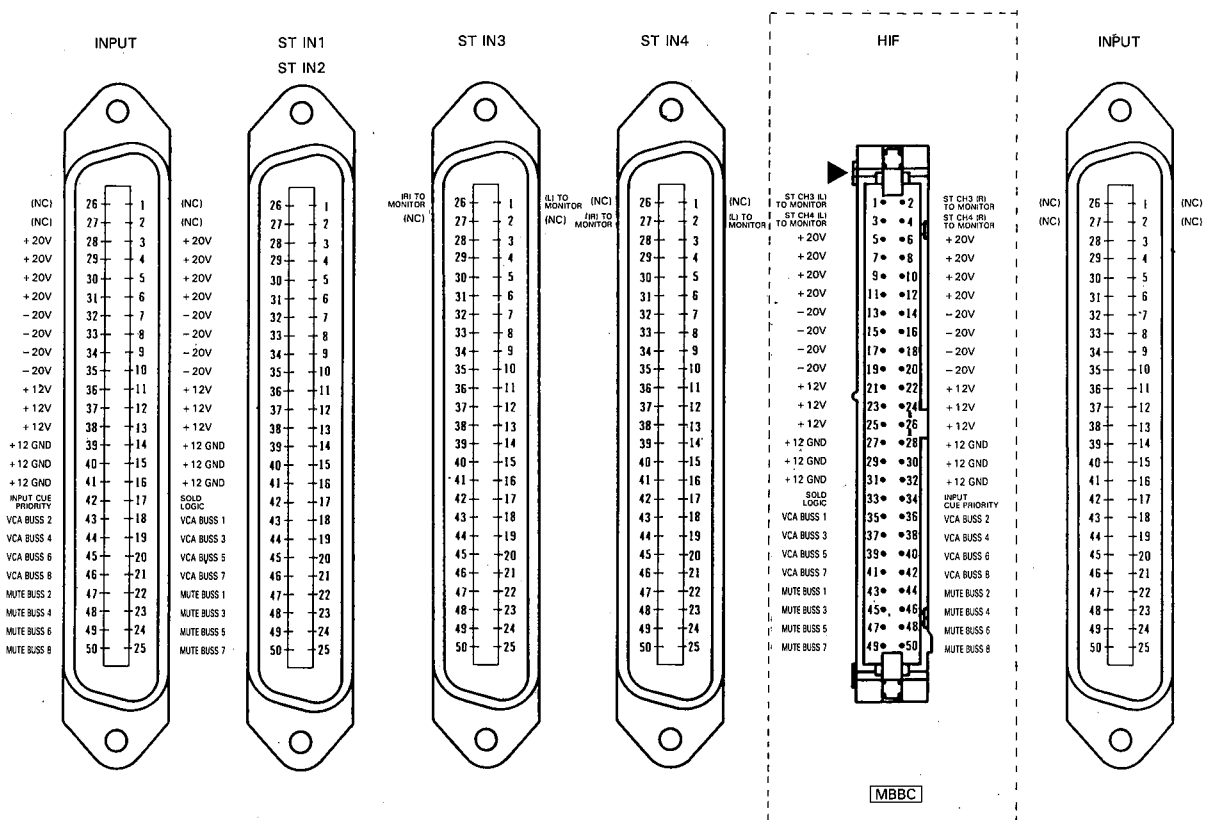


● Flat cable connector pin assignments

TYPE	NADE	COLOR	REMARK
57F	DDK	BLUE	BUS CONNECTOR RIBON CABLE
HIF	HIROSE	BLACK	USED ON BOARD/BORTH SIDE
APX	MATSUSHITA	BLACK	USED ON BOARD/BORTH SIDE

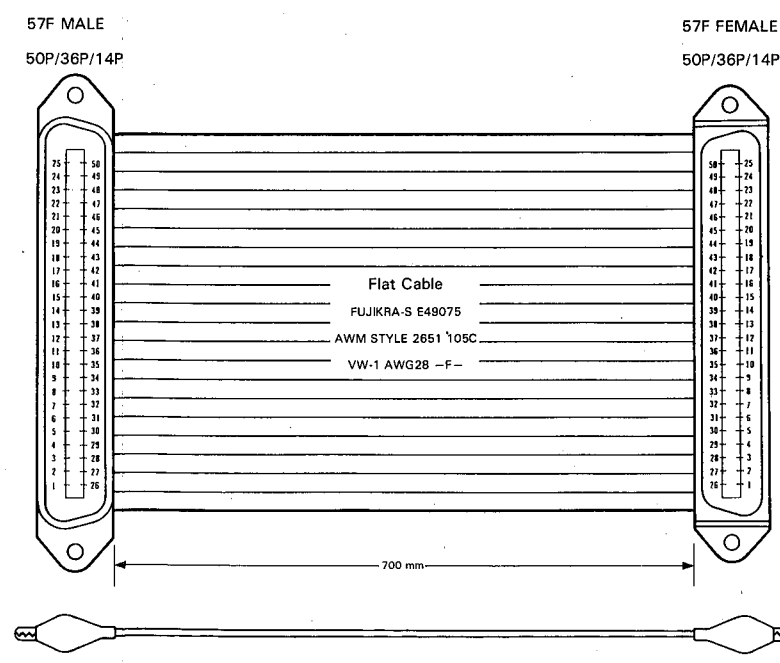


● DC control bus (front side) flat cable pin assignments

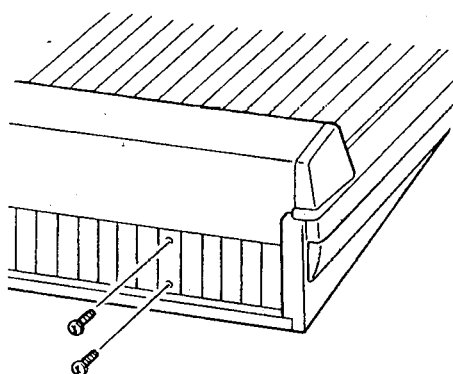


● PM4000 module extension cable for repair servicing

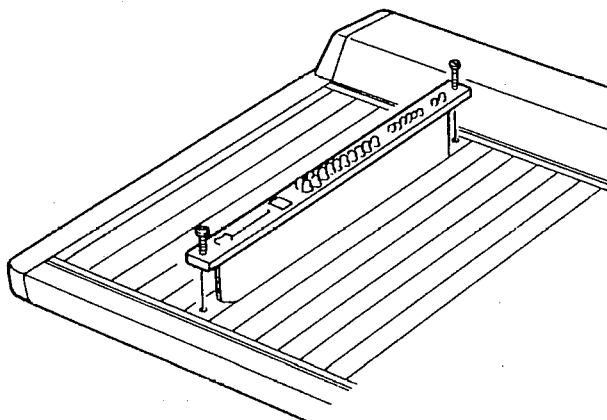
1	50P	Flat Cable	(700mm)	With Connector	× 2
2	36P	Flat Cable	(700mm)	With Connector	× 2
3	14P	Flat Cable	(700mm)	With Connector	× 1
4	Short Wire	Flat Cable	(700mm)	With Clip	× 1



REMOVING AND INSTALLING A MODULE

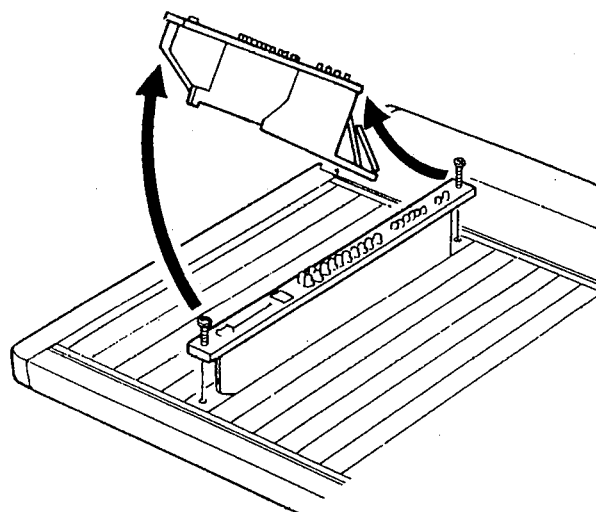


[Fig. 1]



[Fig. 2]

1. Turn the Power OFF first, before removing or installing a module.
2. Loosen the screws at the top and bottom of the rear panel input/output strip corresponding to the module being removed. These screws are not retained so be sure to grasp them and set them aside for reinstallation of the module. [Fig. 1]
3. Loosen the retaining screws at the top and bottom of the module. These screws are retained in the module. [Fig. 2]
4. Lift up on the module's retaining screws (or you may also want to pull up gently on a control knob), and you will feel the two module connectors that join the connectors on the bottom of the console release. Then carefully lift the module out of the console. [Fig. 3]



[Fig. 3]

5. Installation of a module should be done by reversing the order of this procedure. Work slowly to make sure that edge connectors mate properly.

NOTE: If you are moving a module to a different location in the mainframe, one which had housed no module or a different type of module, then you will have to also move the rear connector panel. Input modules may be placed anywhere in the frame, and you can exchange them freely. However, there should be no more than a total of 52 input channels per mainframe.

CAUTION: Do not install PM4000 Stereo Input modules in a PM4000M mainframe. We also do not recommend using PM4000 Mono Input Modules in the PM4000M mainframe since bus assignments will be incorrect (or at least, they will not make sense based on module bus identification).

CHANGING THE FUNCTIONS WITE INTERNAL SWITCHES

1. Input Module Direct Out Jack: Pre-Fader/EQ or Post-Fader (switch) Pre-ON or Post-ON Switch (jumper)

A slide switch in each input module permits the Direct Out point to be altered. As shipped, the console is set so that the Direct Out point is derived ahead of the EQ and Fader (technically speaking, it comes before the VCA which is controlled by the fader). [PM4000 console users, please note that the PM4000M is factory configured with the opposite default of the PM4000 console Direct Out wiring.] If you wish the Direct Out to be

Post-EQ and Fader, move the switch to the appropriate position, as illustrated (note 2 in triangle).

If you switch to Post-EQ, the "POST" direct out point comes factory set to a point ahead of the Channel ON switch, and is thus not affected by the Master Mute function. By changing an internal jumper, you can alter the Post-EQ/Fader Direct Out point to be Post-ON switch, too. The switch location is designated as item 5 (in the triangle) in the illustration below (Figure 2a). Also refer to figure 3 (next page) for the circuit location of this switch.

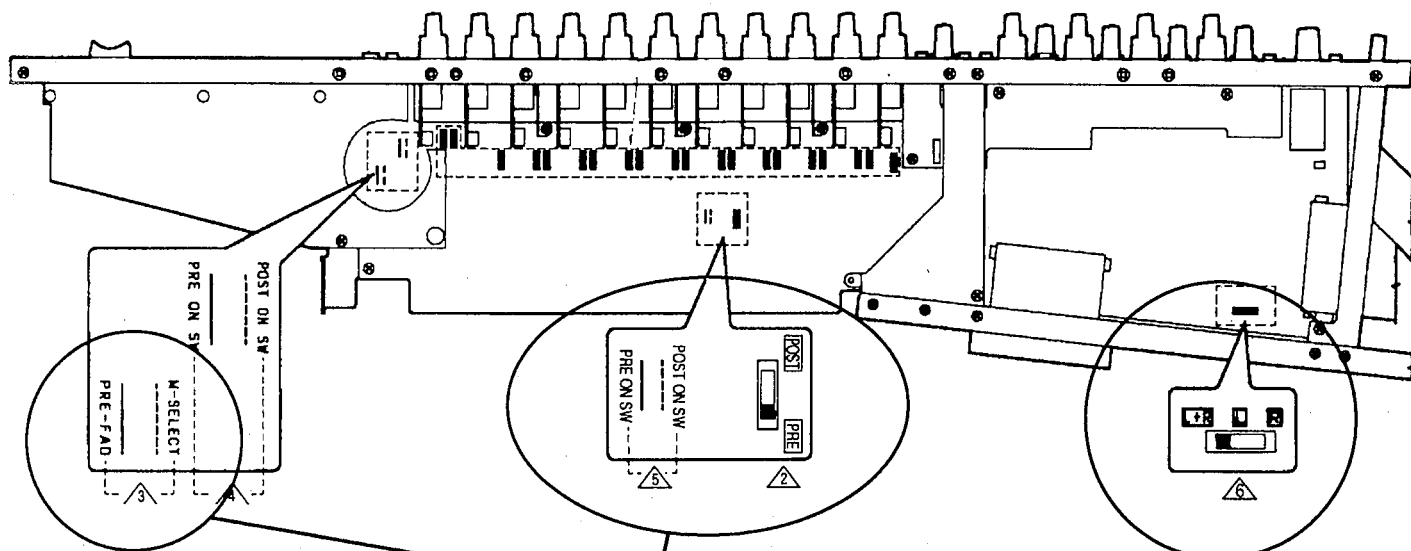


Figure 2b. Internal Jumper Positions for Cue Output Being Pre-Fader or Tracking the METER PRE Switch.

Figure 2a. Internal Switch Positions For Pre-Fader/EQ or Post-Fader/EQ Direct Out Point; Internal Jumper Positions for Direct Out "Post Fader/EQ" being Pre/Post Channel ON Switch.

Figure 2c. Internal Switch Positions for Cue Assigned to: L + R sides of the Cue Bus, L Only, or R Only.

2. Input Module Cue Outputs: Pre-Fader or to Follow the METER PRE Switch

As shipped, the module's CUE outputs are derived from a point just before the fader (actually before the VCA which is controlled by the fader). However, an internal jumper can be reset so that the CUE outputs track the position of the front-panel METER PRE switch [17a]. In that case, the cue could be pre or post fader, depending on the position of METER PRE.

See Figure 2b above and Figure 3 (the block diagram). Look for note 3 in the triangles.

3. Input Module Cue Outputs: To L, R or L+R (switch)

Selection of Cue mode in the input module normally applies the same cue signal to both to the left side and right side of the stereo cue bus. However, a switch in each input module enables you to reassign the cue signal to either the Left or the Right side of the cue bus.

See Figure 2c above and Figure 3 (the block diagram). Look for note 6 in the triangles.

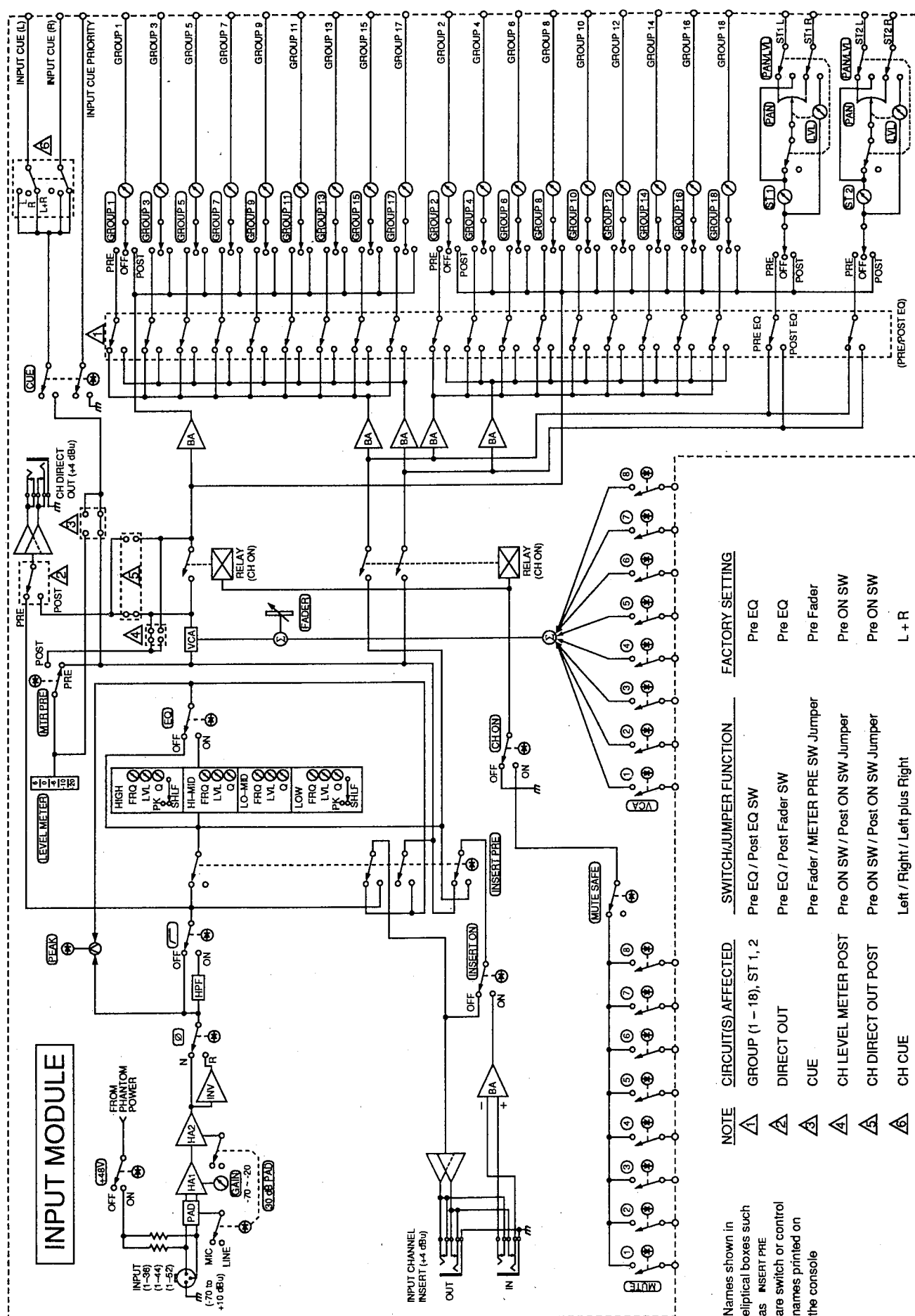


Figure 3. Input Module Block with Location of Switches and Jumpers

Twenty slide switches in each input module permit each of the 18 Group bus assign controls and the two pair of stereo bus assign controls to be altered. As shipped, the console is wired so that if the front-panel aux PRE/OFF/POST switch is set to PRE position, the bus assign is derived ahead of the fader and equalizer (but after the high pass filter). This is useful for stage monitor work, for example, where the channel EQ may not be desirable for use in all output mixes, yet rumble-

reducing filtering is desirable across all mixes derived from that input source. On the other hand, suppose that one or another Group mixes are used for pre-fader effects sends. In this case, it may be desirable to apply channel EQ to the sends. The POST position would provide EQ, but would also cause the channel fader to affect the send, which is not desirable. To solve the problem, the switch for that input's Group or Stereo mix assign can be reset so that the PRE position remains pre-fader, but is taken after the EQ. Refer to note 1 in the triangle in Figure 3 and 4a.

You can select whether the channel's LED meter derives signal before (Pre) or after (Post) the channel fader by means of a front-panel **METER PRE** switch [17a]. If you select **POST**, the meter will be indicating

the level after the fader (actually after the channel VCA) but before the channel ON switch. Thus, turning off the channel outputs will not affect the channel meter. If you want the meter to shut off when you turn off the channel, you can reset an internal jumper, which moves the METER PRE switch's POST source to a point after the channel VCA. Refer to note 4 in the triangle in Figure 3 and 4b.

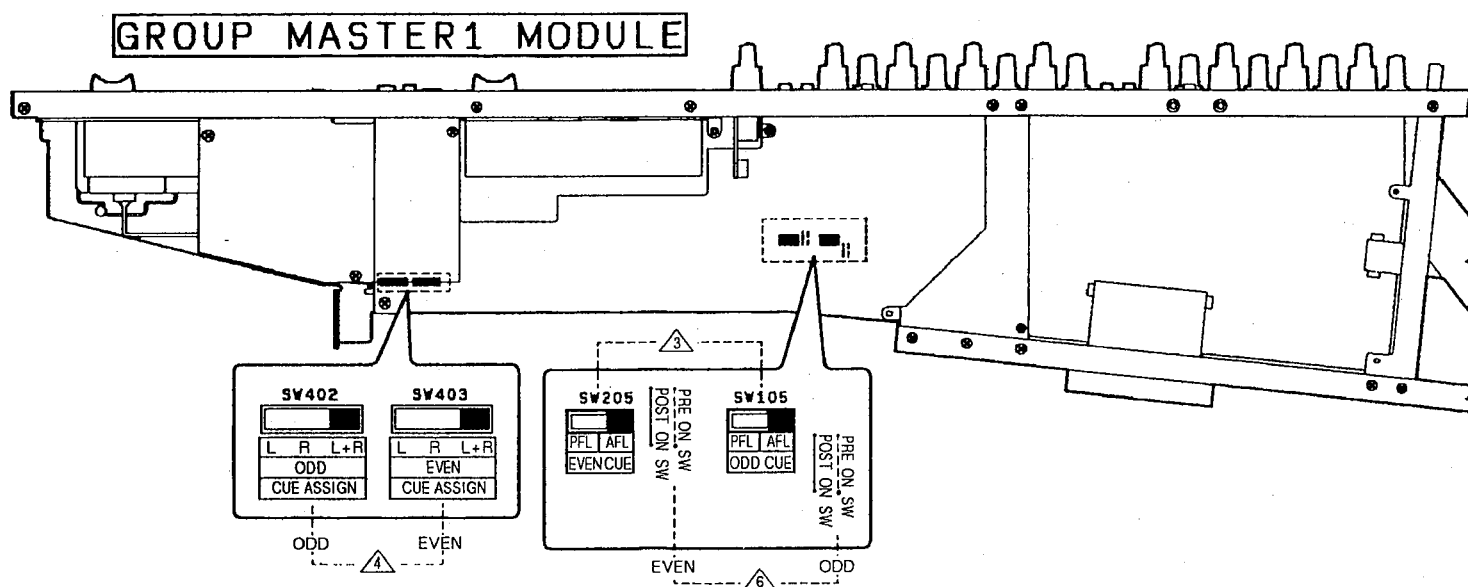
• 6. Master Modules: Cue PFL/AFL Preset Switches

Normally, when you select CUE on a Master module, the cue is derived after the bus output fader and ON/off switch (AFL=After Fader Listen). Thus, if you have pulled the fader down or turned off the bus output, you will not hear anything when you select this cue. This default mode is useful when you wish to hear the relative level of a Group mix as well as its content.

Sometimes, however, you may wish to hear the program on a bus without actually bringing up the bus output level (particularly if the bus is assigned to a

stereo mix and you don't want to affect that mix's balance while you perform diagnostics or EQ touch-up – or you are previewing a mix for an upcoming theatrical cue but don't want to turn on the particular speaker feed just yet.

A pair of slide switches in each Master 1 through Master 9 module permits the module's cue pick-off points to be altered for the odd and even numbered busses controlled by that module. The internal switches in each of these modules can be repositioned so that the cue is derived before the bus fader and ON/off switch (PFL=Pre Fader Listen). See Figure 5a below and Figure 6 (the block diagram). Look for note 3 in the triangles.



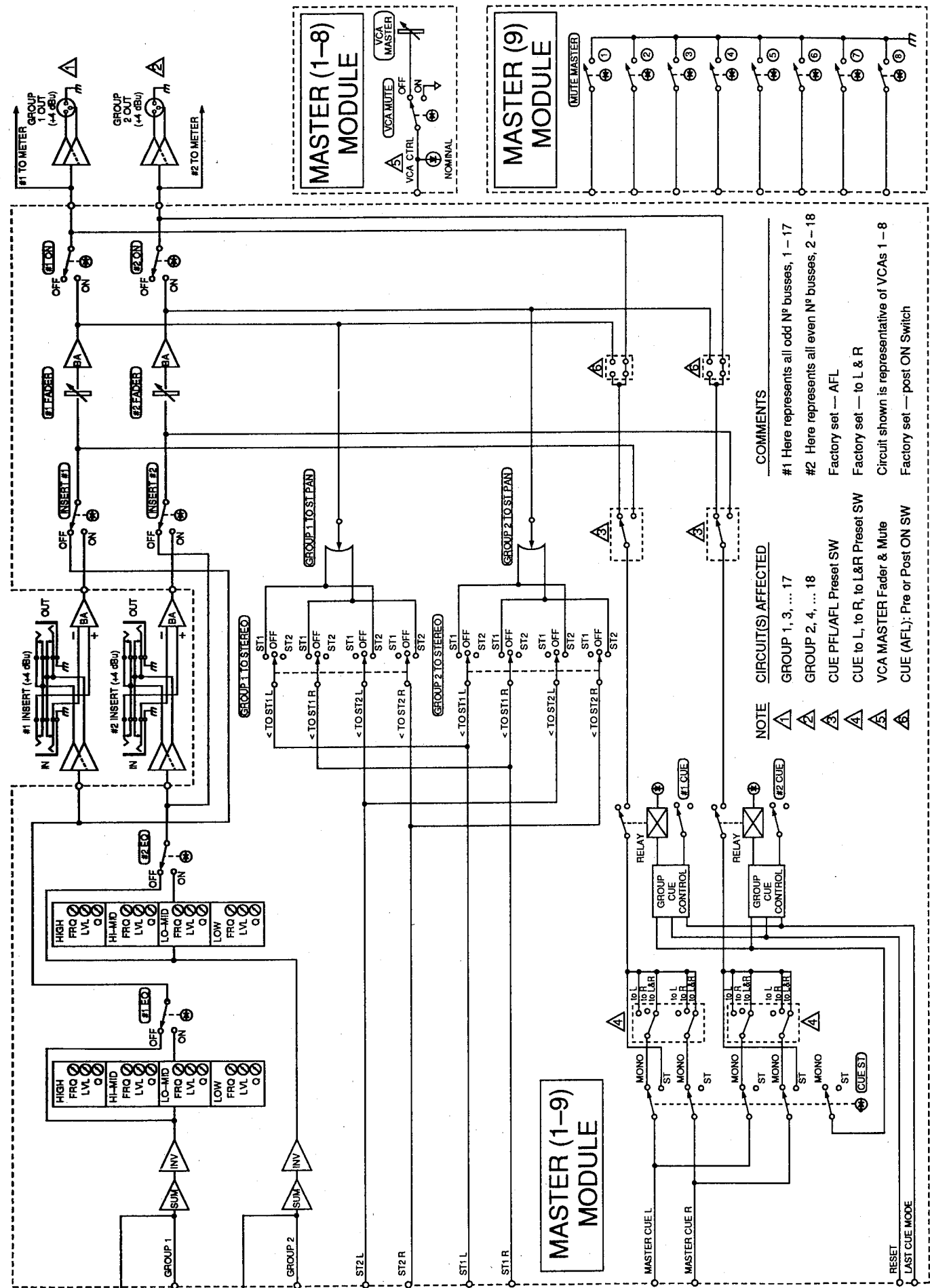


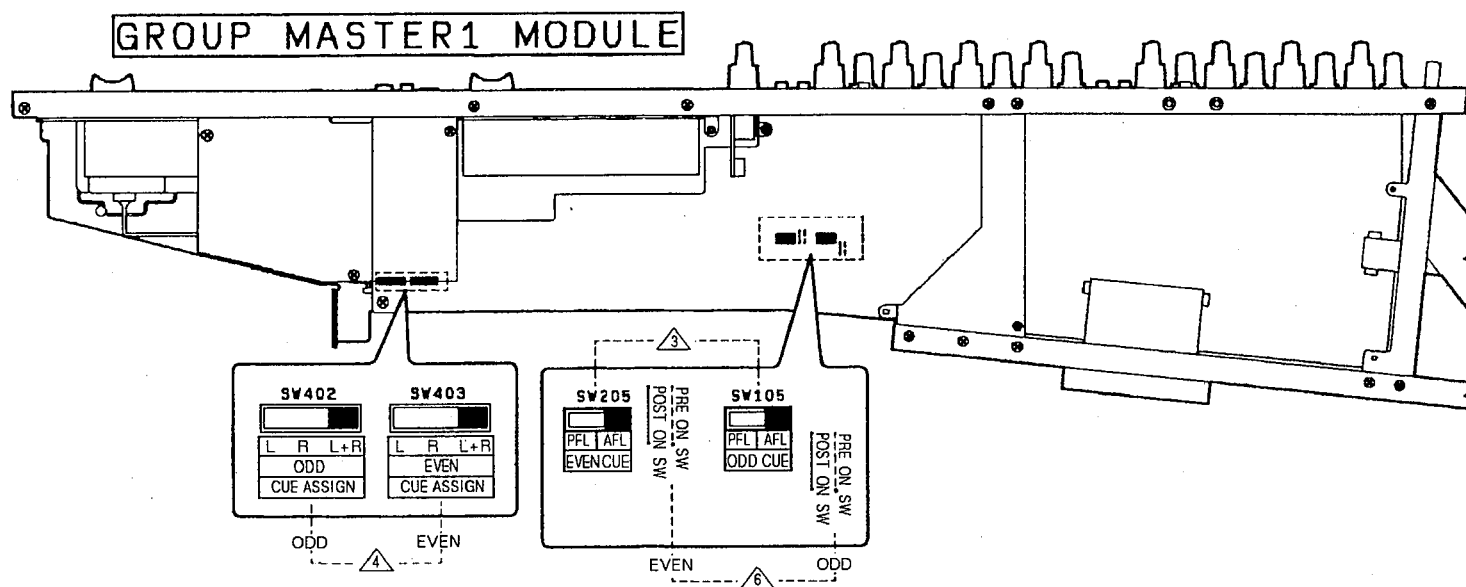
Figure 6. Group Master Module with Location of Switches and Jumpers.

• 7. Master Module (1-9): Cue to L, R or L&R Switches

Selection of Cue mode in the master modules normally applies odd-numbered Group Bus cues to the left side of the stereo cue bus and even-numbered Group Bus cues to the right side of the stereo cue bus. However, a pair of switches in each Master Module (1-9) enables you to reassign the cue signal to either the Left or the Right side of the cue bus.

If you utilize the pair of Group busses controlled by a given Master Module for discrete mono mixes, you may

wish to use the factory preset (L + R). This will let you hear a dual-mono cue (that is, equal proportions of each Group bus assigned to both sides of the Cue bus). Alternately, you may want to reset the two switches to assign the two Groups' cue signals to just one side of the cue mix (left or right). If you are using this pair of Group busses to create a stereo mix, you may wish instead to reset the two switches inside the module to assign their respective cue feeds to the left and right sides of the cue mix. See Figure 7 below and Figure 6 (the block diagram). Look for note 4 in the triangles.



• 8. Stereo Master Module: Cue PFL/AFL Preset Switches

In Section 6 we discussed the function of Cue PFL/AFL switches as they affect the 18 Group Bus Feeds. The Stereo Master Module offers the same Pre/Post Fader Listen options for the Stereo 1 Bus and Stereo 2 Bus cues. The factory-shipped setting is AFL (After Fader Listen).

A pair of slide switches in the Stereo Master module permits the module's cue pick-off point to be changed to PFL (Pre Fader Listen) for the Stereo 1 or 2 bus. See Figure 8a below and Figure 9 (the module block diagram). Look for note 1 in the triangles.

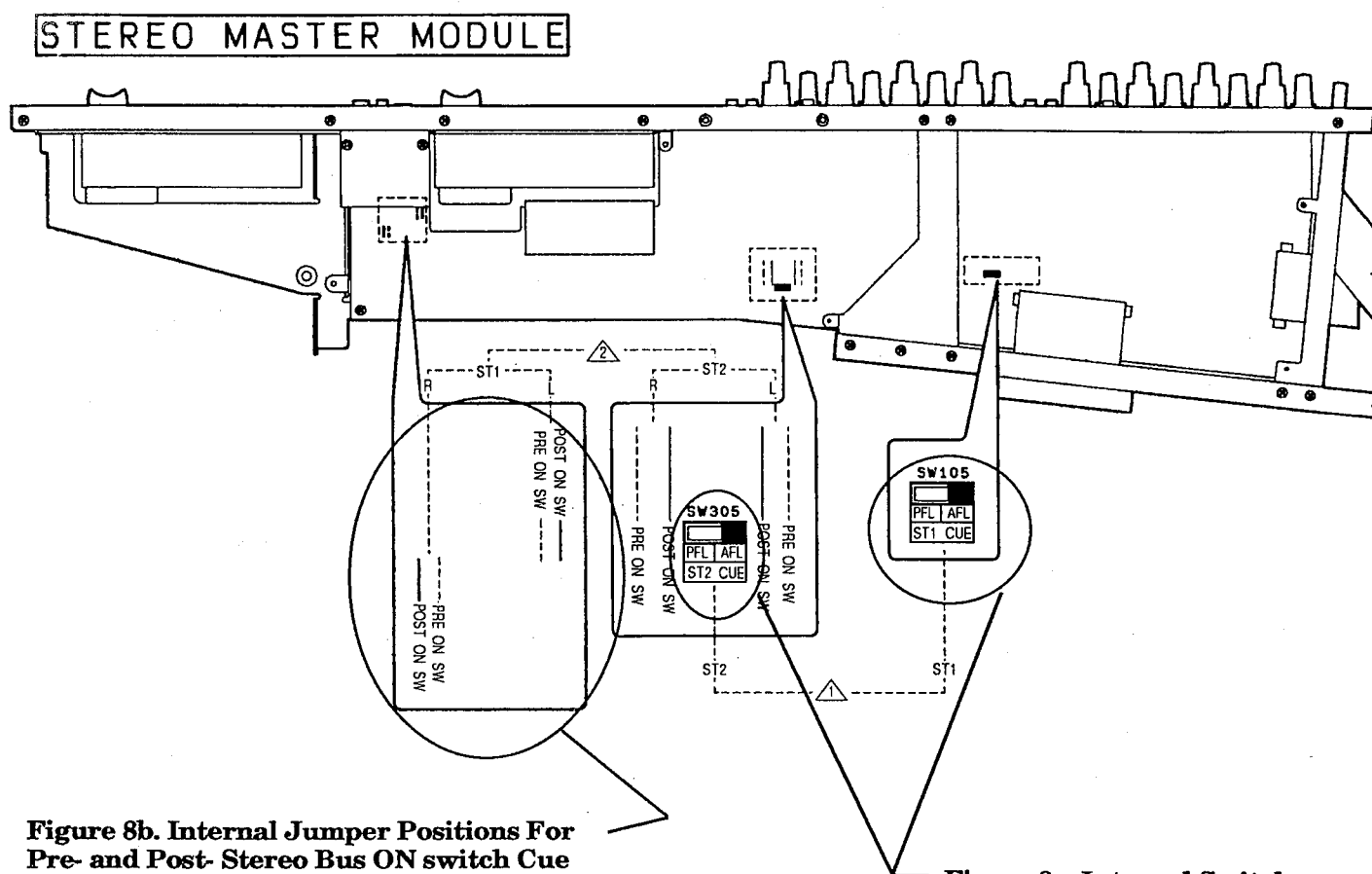


Figure 8b. Internal Jumper Positions For Pre- and Post- Stereo Bus ON switch Cue Feed. Only one of the two sets of L & R jumpers is circled here (for ST1). The other pair of jumpers to the right that straddle one of the PFL/AFL switches performs the same function for the ST2 bus.

Figure 8a. Internal Switch Positions for Pre- and Post- Stereo Master Fader Cue Feeds.

• 9. Stereo Master Module: Cue AFL Source Jumpers (Pre/Post Bus ON switch)

In Section 6 we discussed the function of the internal CUE Source jumpers when the internal PFL/AFL switch is in the default (AFL) position. The Stereo 1 and Stereo 2 busses work the same way, with the signal derived after the bus ON switch. If you cue the bus but have turned off the bus output, you will not

hear anything. This default mode is useful when you wish to hear the relative level of a stereo mix as well as its content.

Sometimes, however, you may wish to hear the program on a bus at the set mix level, but without applying signal to the output. You can do this by resetting a jumper for that bus in this module. See Figure 8b above and Figure 9 (the block diagram). Look for note 2 in the triangles.

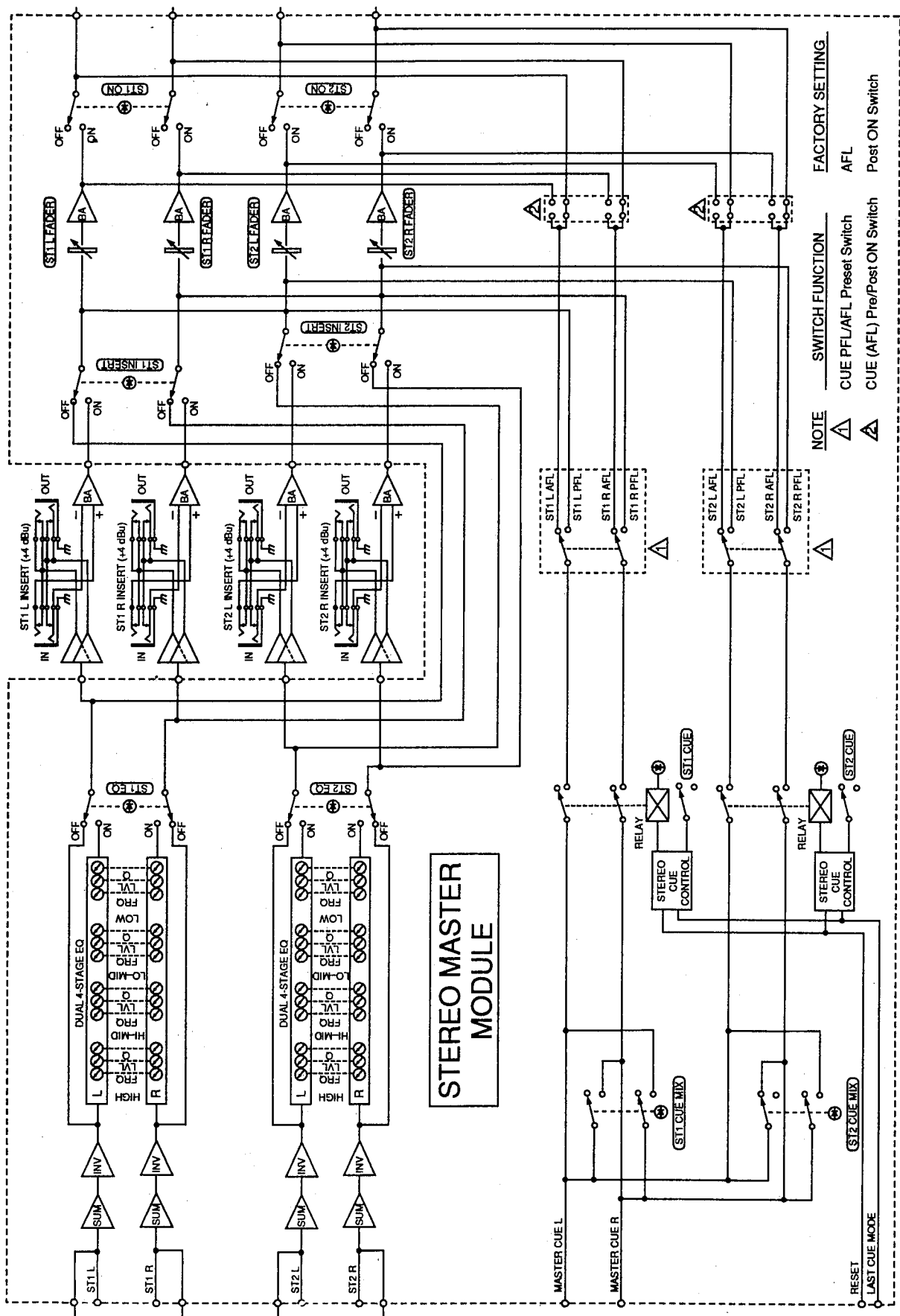


Figure 9. Stereo Master Module Block Diagram with Location of Switches and Jumpers.

• 10. Installation of Optional Input Transformers

The PM4000M standard input module is equipped with a balanced, differential input preamplifier for the XLR connector. That preamp, along with some circuitry for the resistive attenuation pads, is located on a small printed circuit board that "piggy back" mounts to the module's main circuit board. Refer to Figure 10A.

The modification kit contains a replacement circuit board for the original differential preamplifier, and a separate input transformer. In order to install the kit, the following steps must be performed.

1. Shut off the power to the console.
2. Remove any input module(s) to be equipped with transformers.
3. Install the transformer into the included fitting with the nut as shown in Figure 10B.

4. Being careful with the wiring, unfasten Angle bracket H of the module by removing the two small flat-head screws and the two small bind screws.
5. From the inside of Angle H, insert the two small M3 screws provided with the transformer kit, and attach the transformer fitting (Figure 10C).
6. Restore Angle H to its original position.
7. Pass all the wiring through the slit in Angle-R.
8. Solder the transformer wiring to the new input transformer board (Figure 10D).
9. Remove the present input circuit board (transformer area) and replace it with the new transformer board.
10. Reinstall the input module into the console main-frame. When doing so, be sure that the new transformer wiring does not protrude from the module. Damage could otherwise occur during module insertion or subsequent removal.

The above completes the procedure for installation of an input transformer. Check the Fader and PAD signals to verify the installation.

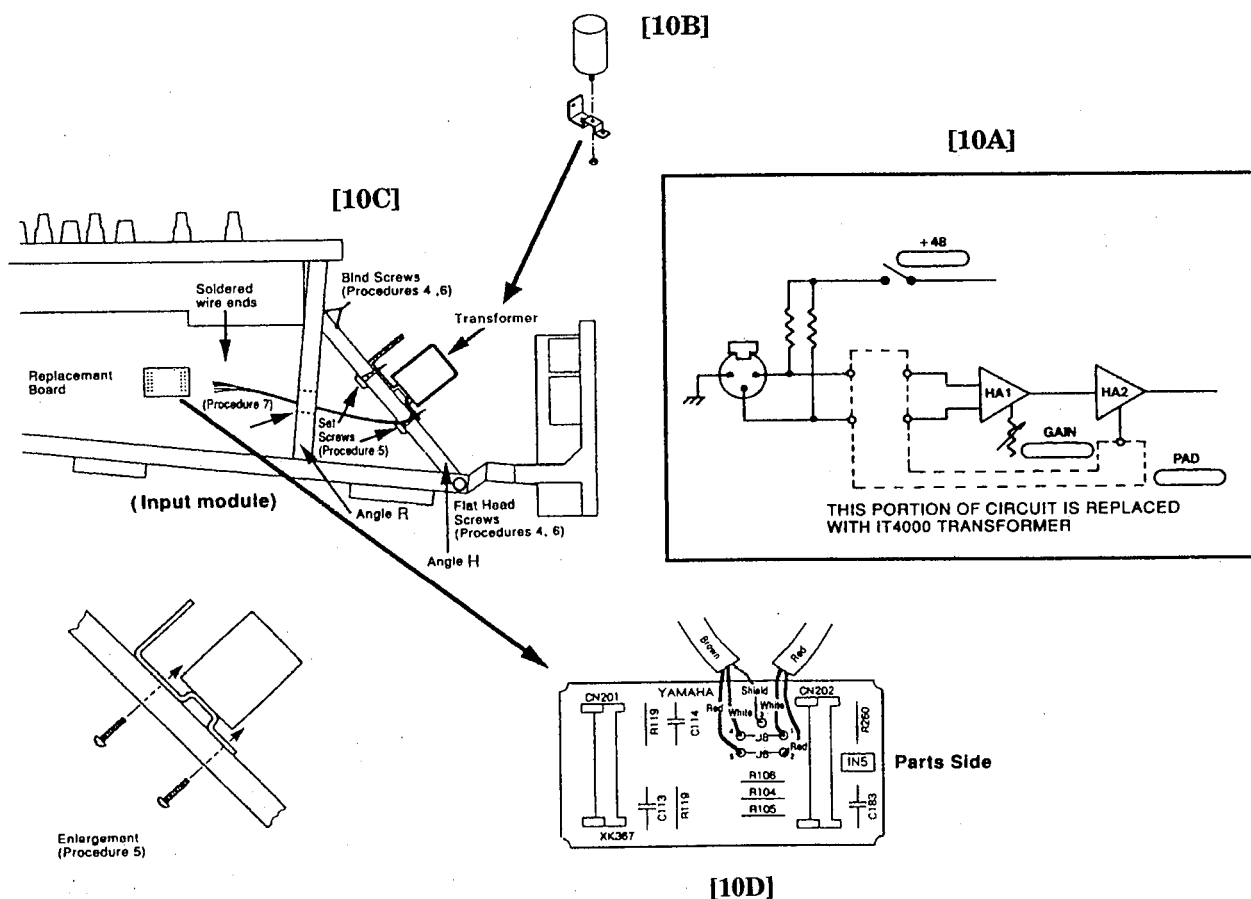


Figure 10. Optional Input Transformer Installation

● 11 Hints on Circuitry For Remote Control of the VCA Masters and Mute Groups

The VCA/MUTE CONTROL connector on the PM4000M rear panel is provided primarily so that two consoles may be linked, and just one console's VCA MASTER FADERS and/or MUTE MASTER switches will affect both consoles input channels. However, it is possible to create an independent controller so that these functions can be remoted from the console. One possible application would be to remotely adjust mix levels in the middle of a venue even though the console is located in a booth. Another possible application would be the creation of a limited automation system. Yamaha does not offer detailed instructions for this type of remote control. However, we do present here a schematic diagram of the VCA control fader circuit which, if constructed externally by a competent technician and interfaced via the VCA/MUTE CONTROL connector, can do the job.

Note that the nominal fader position delivers 0 VDC to the VCA, and the VCA operates at unity gain with that input. The control voltage scaling is approximately -20 dB per volt DC in the linear range of fader travel (above -50 dB on the fader scale). Thus, at maximum upward fader travel, a single fader will deliver about 0.5 volt negative, which drives the VCA to +10 dB of gain. If several VCA faders are set above nominal and assigned to a channel, the maximum negative voltage that will be applied to the VCA is -1.2 VDC (a DC

limiter circuit prevents any more negative voltage from being passed and turns on the VCA MAX LED). This corresponds to +24 dB of gain. At minimum VCA fader setting, the output is +10 VDC, corresponding to over 100 dB of attenuation.

The VCA and MUTE connections are illustrated in REAR PANEL layout section . In order to mute a group, ground the conductor corresponding to that group. The console's VCA MASTER/SLAVE and/or MUTE MASTER/SLAVE switch(es) must be set to the SLAVE position in order for the corresponding remote control to take effect on the designated busses and mute groups.

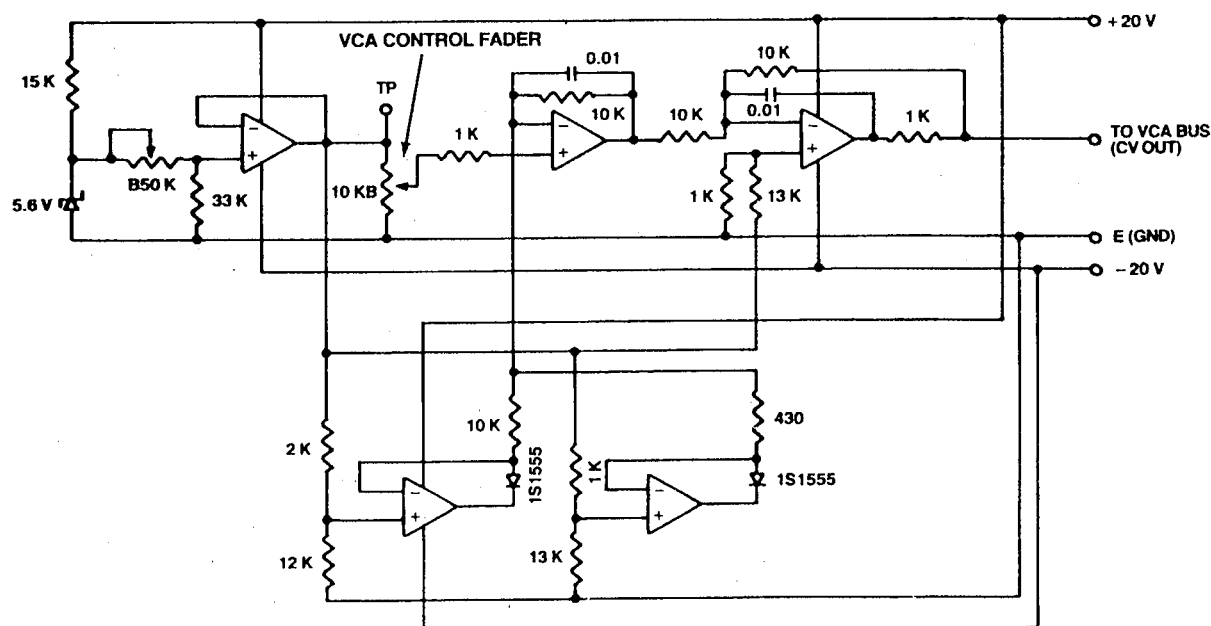
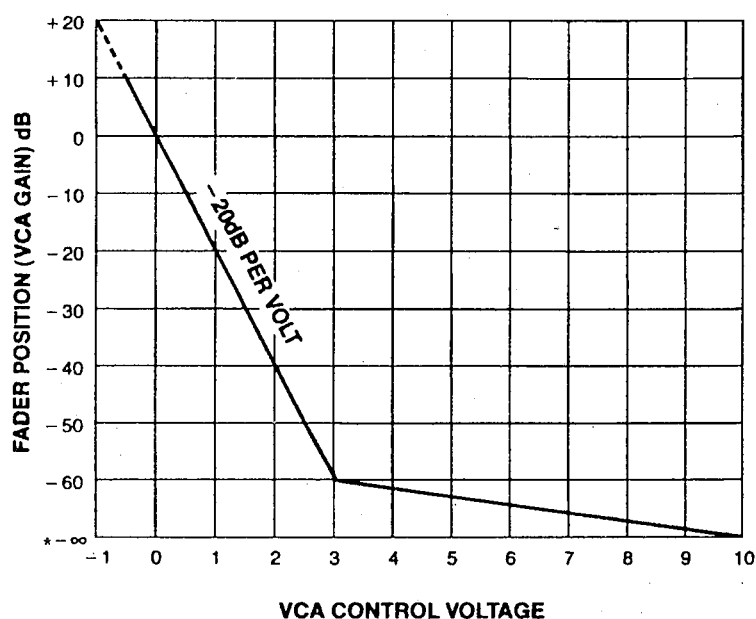


Figure 11. Suggested Circuit for Remote Control of a VCA Master Group

YAMAHA PART #	QUAN	SUFFIX LETTER	ITEM	VALUE OR TYPE
UA21410	2	K	MYLAR CAPACITOR	0.01 μ F, 50 V
HU07543	1	F	METALIZED FILM RESISTOR	430 ohm, $\frac{1}{4}$ W
HU07610	4	F	METALIZED FILM RESISTOR	1 kohm, $\frac{1}{4}$ W
HU07620	1	F	METALIZED FILM RESISTOR	2 kohm, $\frac{1}{4}$ W
HU07710	4	F	METALIZED FILM RESISTOR	10 kohm, $\frac{1}{4}$ W
HU07712	1	F	METALIZED FILM RESISTOR	12 kohm, $\frac{1}{4}$ W
HU07713	2	F	METALIZED FILM RESISTOR	13 kohm, $\frac{1}{4}$ W
HK05715	1	J	CARBON RESISTOR	15 kohm, $\frac{1}{4}$ W
HK05733	1	J	CARBON RESISTOR	33 kohm, $\frac{1}{4}$ W
IG06920	3		IC AMP	MJM2041DD
HT56009	1	B	SEMI-FIXED VR (TRIMMER)	50 kohm
IF00004	2		DIODE	1S1555
IF00214	1		ZENER DIODE	RD5.6ED2
VA25610	1	B	SLIDER VR (FADER)	10 kohm

**Table 1. Parts List for Making
Remote VCA Control Circuit**

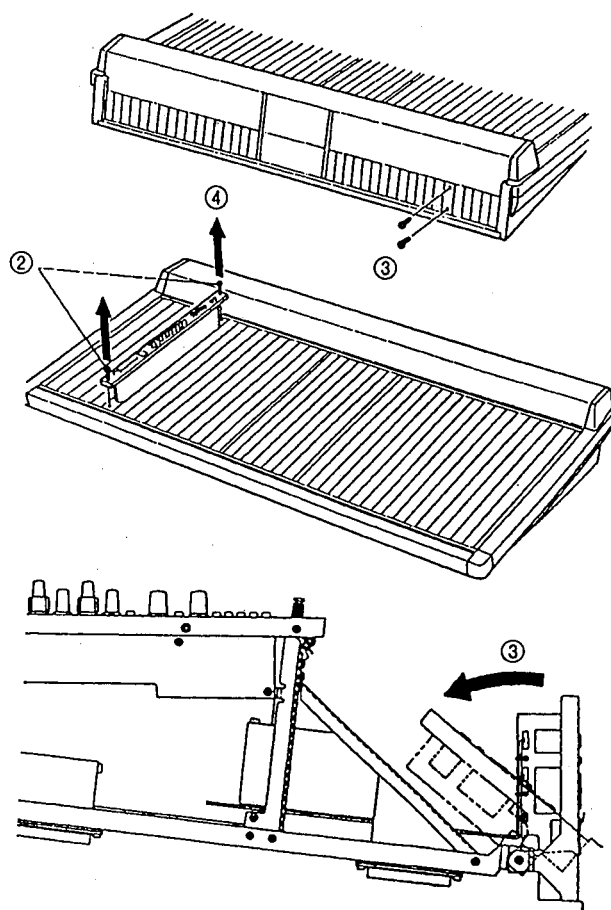


*CHANNEL ON relay opens when fader is at $-\infty$ position.

**Figure 12. VCA Control Voltage
versus Fader Position**

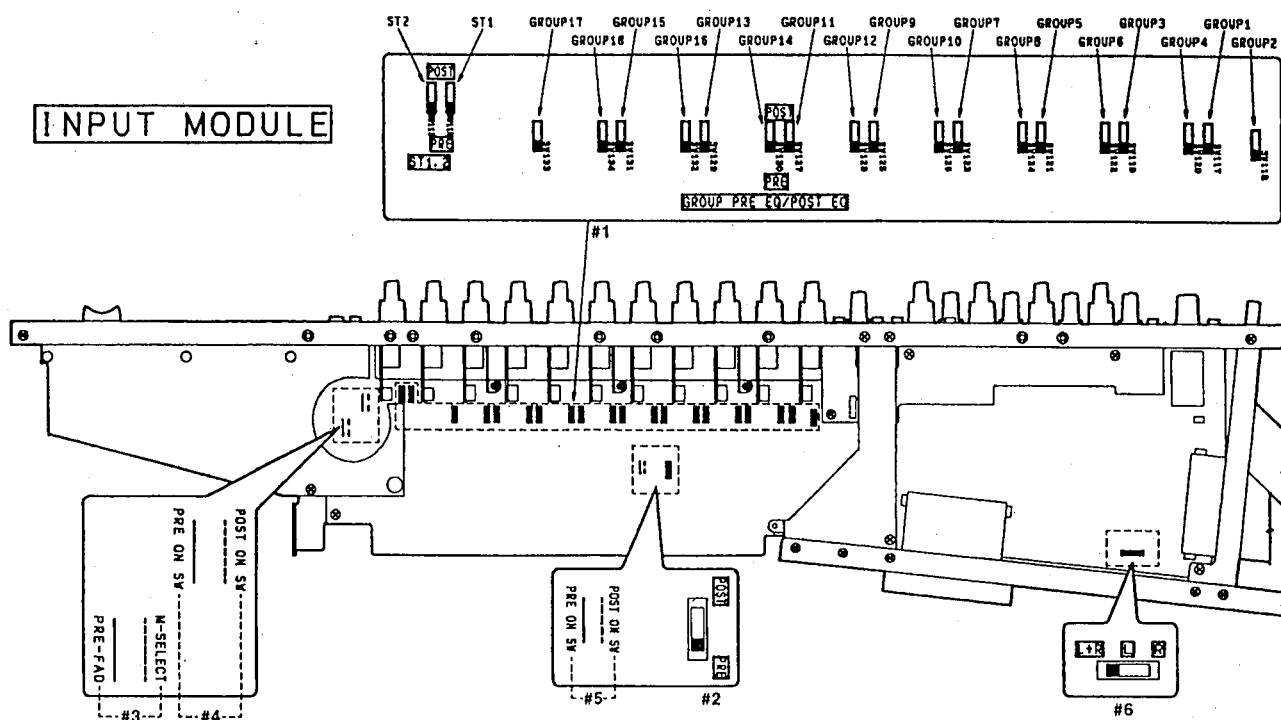
■ モジュールの取り外し&取り付け

- ① モジュールを取り外したり、取り付けたりする前に、必ず電源をOFFにしてください。
- ② 取り外すモジュールのフロントパネル前・後2本のプラスネジをゆるめます。このネジはモジュール上面に抜け出さないような構造になっています。
- ③ MASTERモジュールは②のフロントパネル前後2本のネジのみで本体に取り付けられていますが、INPUTモジュールは該当するモジュールのリアパネルの上下2本のプラスネジもはずします。
このときリアパネルの上部が内側に倒れていることを確認してください。倒れない場合は軽く手で押し倒してください。
- ④ ②でゆるめた前後2本のフロントパネルのネジを指でつまみ、モジュールをコネクタがはずれるまで上方に引き上げます。
MASTERモジュールは平行に引き上げると本体からはずれますが、INPUTモジュールは、モジュールの手前側を後方よりやや先に上に持ち上げ、リアパネルがメータブリッジの下をくぐるようにしてモジュールを取り外します。
- ⑤ モジュールの取り付けは、この手順と逆に行います。モジュール下部のコネクタが正しく合っていることを確認しながら、確実に行ってください。



内部切替スイッチ、ジャンパー線の変更

●1. INPUTモジュール



#1 GROUP 1～18, ST1/2のPRE EQ/POST EQ

このスイッチにより、GROUP 1～18, ST1/2信号のバスへの取り出し位置を、ブレイコライザーにするか、ポストイコライザーにするかを選択することができます。出荷時はブレイコライザーにセットされています。

#2 DIRECT OUTのPRE EQ, PRE FADER/POST FADER

このスイッチにより、DIRECT OUTの出力を、ブレイコライザー、プリフェーダーにするか、ポストフェーダーにするかを選択することができます。出荷時はプリフェーダーにセットされています。

#3 CUE信号のPRE FADER/follow MTスイッチ

このジャンパー線により、CUE信号の取り出し位置をプリフェーダー固定にするか、メータースイッチ(MT PRE)のPRE/POSTの選択に連動した、プリフェーダー、ポストフェーダーの切り替えとするかのいずれかを選ぶことができます。出荷時はプリフェーダーにセットされています。

#4 MT POST位置でのPRE ON SW/POST ON SW

チャンネルレベルメーターの指示値は、モジュールパネル面上のMT PREスイッチで、プリフェーダーかポストフェーダーかを選択ができます。このジャンパー線でポストフェーダー時の信号検出位置を、チャンネルONスイッチ前にするか、チャンネルONスイッチ後にするかを選択することができます。出荷時はONスイッチの前にセットされています。

#5 DIRECT OUTのPOST位置でのPRE ON SW/POST ON SW

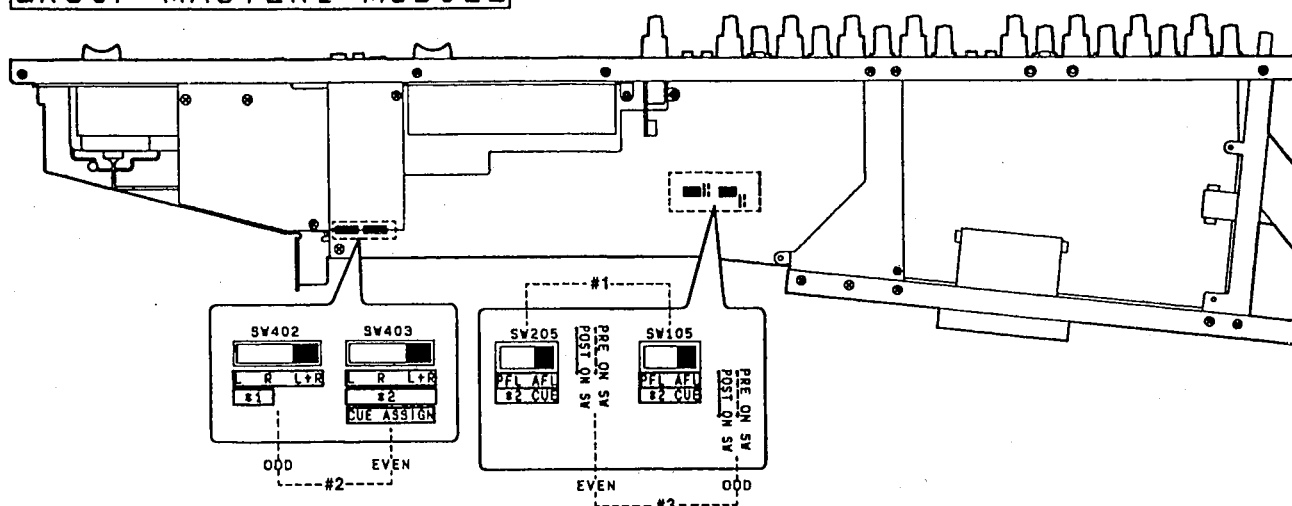
このジャンパー線により、#2の設定がPOSTの場合のDIRECT OUT信号の取り出し位置を、チャンネルONスイッチ前にするか、後にするかを選択することができます。出荷時はONスイッチ前にセットされています。

#6 CUE信号の送り出しL+R, L, R選択スイッチ

このスイッチにより、CUE信号の送り出し先を選択することができます。出荷時はL+Rにセットされています。

● 2. GROUP MASTERモジュール

GROUP MASTER1 MODULE



#1 CUE信号のPRE FADER/POST FADER

このスイッチにより、GROUP OUT CUE信号の取り出し位置をAFL(アフターグループマスターフェーダーレベル)にするか、PFL(プリグループマスターフェーダーレベル)にするかを選択できます。出荷時はAFLにセットされています。

PFLの場合、GROUP ON/OFFスイッチ前の信号です。AFLの場合、#3の内部ジャンパー線でGROUP ON/OFFスイッチの前に変更可能です。

#2 ST SW OFF(CUE信号がMONO)時の、CUE信号設定

このスイッチにより、STスイッチがOFF時のGROUP OUT CUE信号の取り出し方法を選択することができます。"to L"にするとCUEバスのL側、"to R"にするとCUEバスのR側、"to L/R"にするとCUEバスのL/R両方に送り出されます。

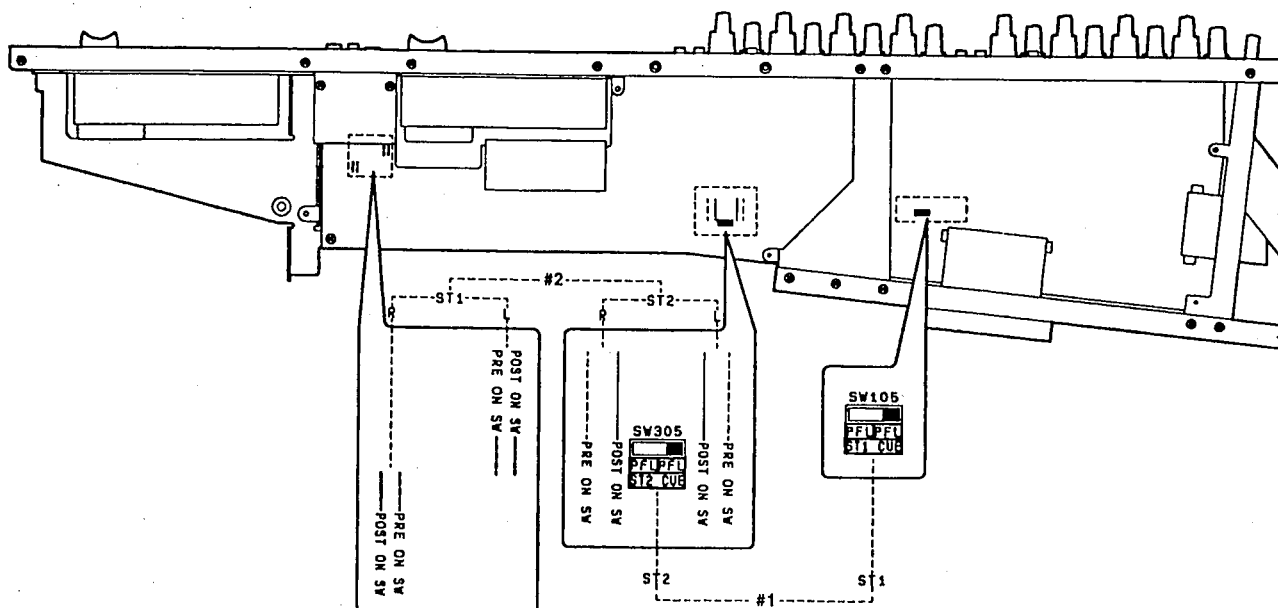
出荷時は"to L/R"にセットされています。

#3 CUE信号のPRE/POST ON SW

#1の設定がAFLの場合、このジャンパー線により、GROUP OUT CUE信号の取り出し位置をPRE ON SWにするか、POST ON SWにするかを選択できます。出荷時はPOST ON SWにセットされています。

● 3. STEREO MASTERモジュール

STEREO MASTER MODULE



#1 CUE信号のPRE FADER/POST FADER

このスイッチにより、ST1/2 OUT CUE信号の取り出し位置をAFL(アフターステレオマスターフェーダーレベル)にするか、PFL(プリステレオマスターフェーダーレベル)にするかを選択できます。出荷時はAFLにセットされています。

PFLの場合、ST1/2 ON/OFFスイッチ前の信号です。AFLの場合、#2の内部ジャンパー線でST1/2 ON/OFFスイッチの前に変更可能です。

#2 CUE信号のPRE/POST ON SW

#1の設定がAFLの場合、このジャンパー線により、ST1/2 OUT CUE信号の取り出し位置をPRE ON SWにするか、POST ON SWにするかを選択できます。

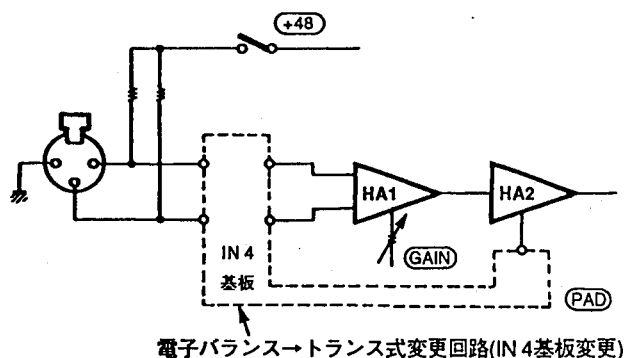
出荷時はPOST ON SWにセットされています。

●4. 入力トランス(オプション)の取り付け

PM4000MのINPUTモジュールは電子バランスとなっています。通常使用状態において、アイソレーションに関する問題はなにも心配することはありませんが、トランスフォーマーによるアイソレーションを希望する方のための、オプションとしてIT4000を用意しています。

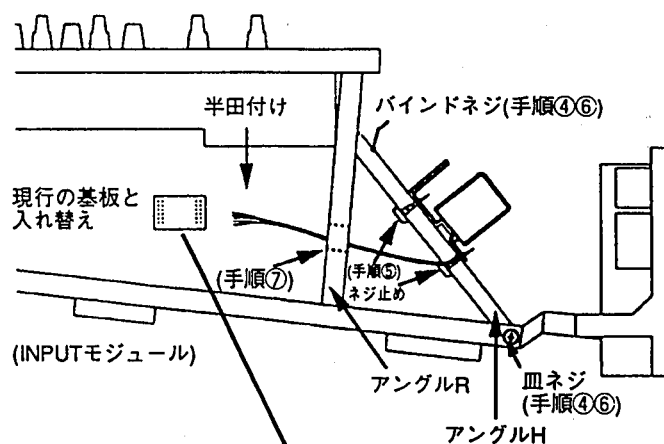
この改造キットには、交換用基板/入力トランスフォーマー/トランス金具/取り付け用ネジが入っています。キットの取り付けは、次の手順に従って行ってください。

・入力トランスの取り付け位置

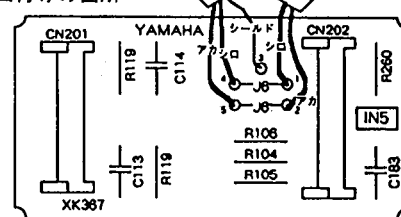


※トランス式に変更することにより入力インピーダンスが変わります。
電子バランス=3kΩ
トランス入力=1kΩ

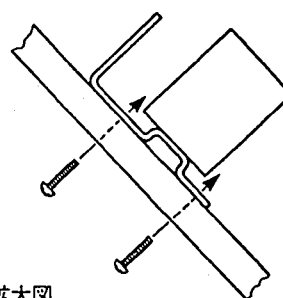
手順③
モノラルは1個取付



部品取付面から見た
半田付けの箇所



手順⑤拡大図



●取り付け手順

- ① コンソールの電源を切ります。
- ② 入力トランスを取り付けるINPUTモジュールを取り外します。(モジュールの取り外し&取り付けを参照)
- ③ IT4000に同梱のトランス金具にトランスをナットで取り付けます。
- ④ モジュールのアングルHを外します。皿小ネジ2本、バインド小ネジ2本をはずす。このとき、リアパネルに通っている線材に気をつけて外してください。
- ⑤ トランス金具の孔と、アングルHに設けられている2つの孔を合わせてアングルHの内側からM3小ネジ2本で取り付けます。
次に、トランスの線材をアングルHの角孔に通します。
- ⑥ アングルHを元通りに取り付けます。

- ⑦ トランスの線材をモジュールのアングルRにあいているスリットに通します。
- ⑧ IT4000に同梱の基板と、トランスの線材を半田付けします。半田付け位置は図を参照してください。
- ⑨ 現行基板を引き取り外し、その位置にトランス線に取り付けた新しい基板を差し替えます。

以上で取り付けは完了ですが、信号を入力して、位相やPADの機能を確認してください。

※ モジュールの取り外し・取り付けの際に断線の恐れがありますので、線材はモジュールの幅より、はみ出さないように処理してください。

● 5. 外部コントロール

下記条件を満足するようにハードウェアを追加することにより、外部コントロールも可能となります。

(1) VCA/MUTE CONTROLピン配置

PIN No.	信号名	PIN No.	信号名
1	VCA EXT1	13	MUTE EXT3
2	VCA EXT2	14	MUTE EXT4
3	VCA EXT3	15	MUTE EXT5
4	VCA EXT4	16	MUTE EXT6
5	VCA EXT5	17	MUTE EXT7
6	VCA EXT6	18	MUTE EXT8
7	VCA EXT7	19	リアパネルGND
8	VCA EXT8	20	リアパネルGND
9	リアパネルGND	21	リアパネルGND
10	NC	22	INPUT CUE EXT
11	MUTE EXT1	23	NC
12	MUTE EXT2	24	NC

(2) レセプタクル

#SRCN2A25-24S JAE((株)日本航空電子製)

対応するプラグ

#SRCN2A25-24P

(3) 外部条件

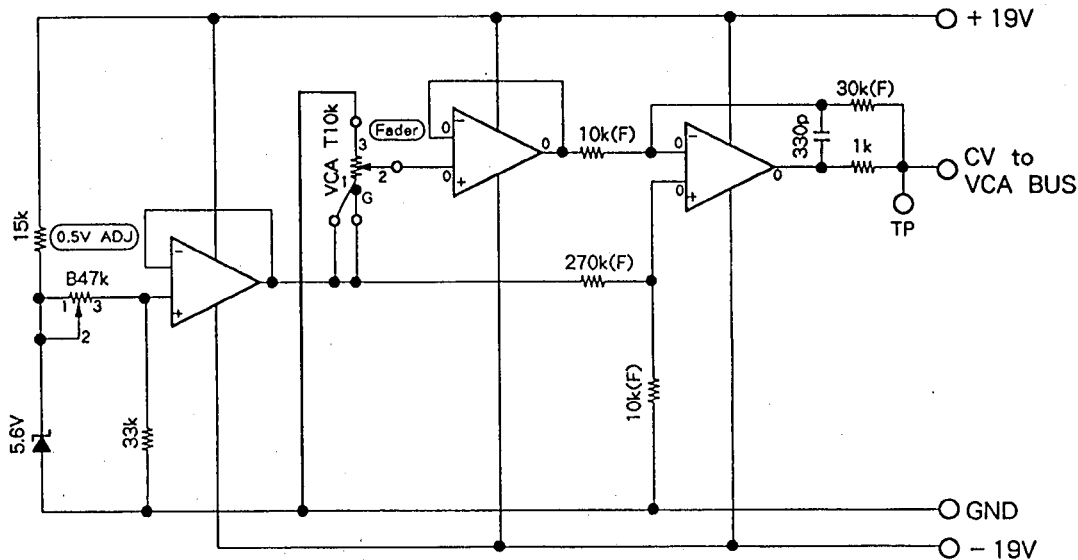
a.VCA

a-1 VCAグループコントロール

VCAのコントロール電圧は-20dB/Vです。コントロール電圧0VでVCAのゲインを0dBとし、最大絞りきりに対しては10Vを印加しています。

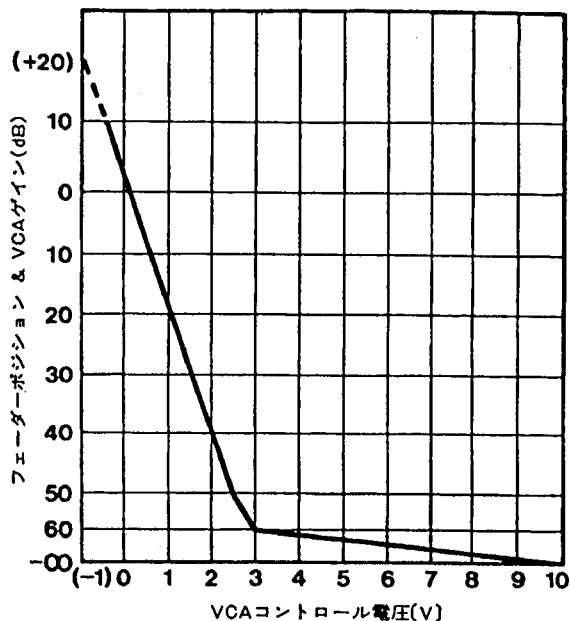
* VCA BUSでは右上グラフの電圧が正負逆になっています。

a-2 VCA外部コントロール参考回路



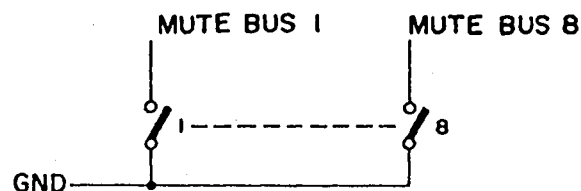
* TPにおいてフェーダーMAX時に0.5Vになるように半固定ボリュームB47Kを調整します。

* この回路を使用する場合、変化特性はPM4000MのVCA MASTERフェーダーと同じになります。ただし、フェーダーはPM4000M専用特殊カーブとなっています。



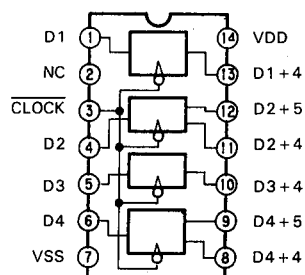
b.MUTE

GNDとMUTE BUS間を短絡することによりMUTEされます。

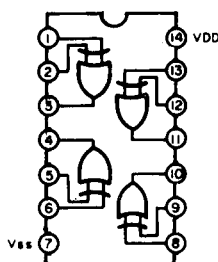


■ IC BLOCK DIAGRAM (ICブロック図)

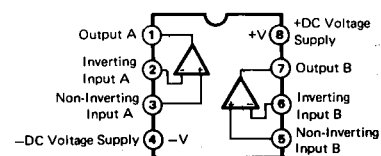
- **TC4006BP** (IG001680)
18-Stage Static Shift Register



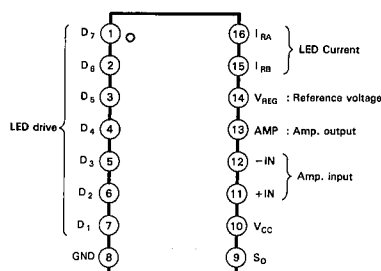
- **TC4030BP** (IG001790)
Quad Exclusive-OR Gate



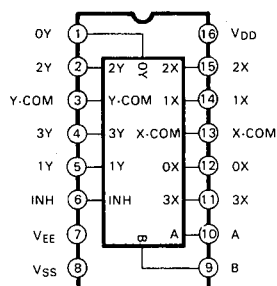
- **NJM2041D-D** (IG069200)
• **NE5532P** (IG102500)
Dual Operational Amplifier



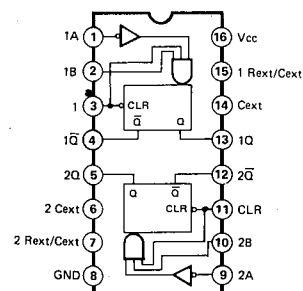
- **IR2E19** (IG136600)
LED Driver



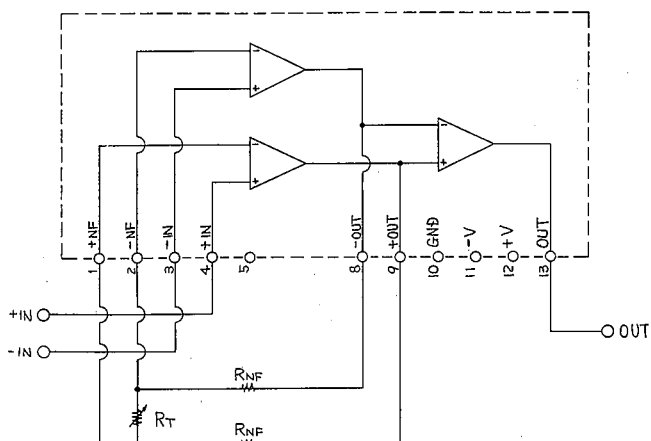
- **TC4052BP** (XA053A00)
Differential 4-Channel
Multiplexer/Demultiplexer



- **TC74HC123AP** (IR012300)
Dual Retriggerable Single short

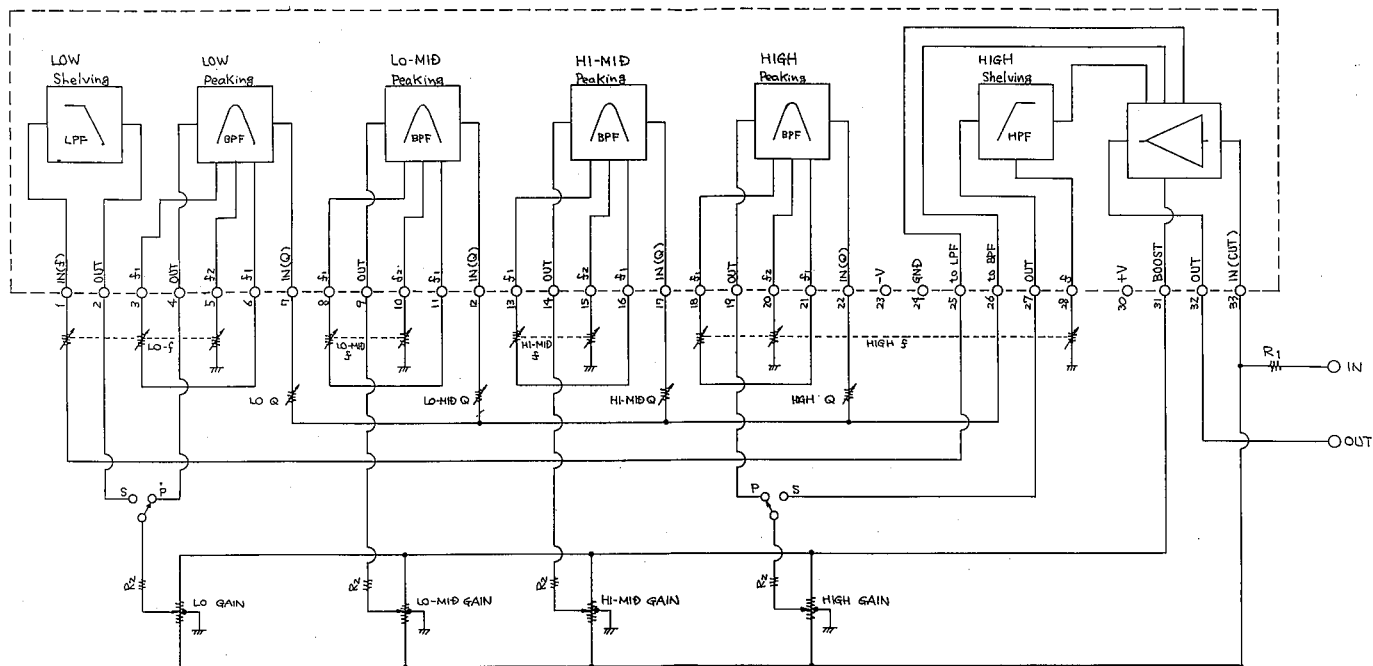


- **917090** (XK866A00)
HA



$$\text{GAIN} = 20 \times \log \left(1 + \frac{2 \times R_{NF}}{R_T} \right)$$

• **911308 (XK867B00)**
PEQ

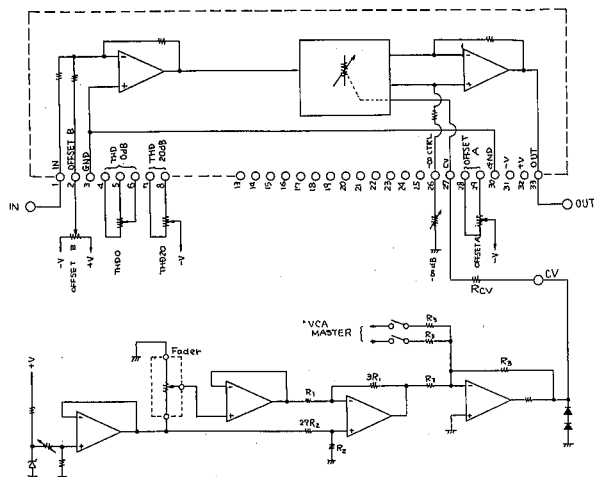


$$Q = (VRa[k\Omega] + 6.8)/20.4$$

$$EQ \text{ MAX GAIN} = 20 \times \log ((R_1 + R_2)/R_2)$$

$$EQ f = 1/(2 \times \pi \times R \times C) \quad [R = 2700 + VRf [\Omega], C = 0.1\mu, 0.036\mu, 0.0075\mu, 0.003\mu[F]]$$

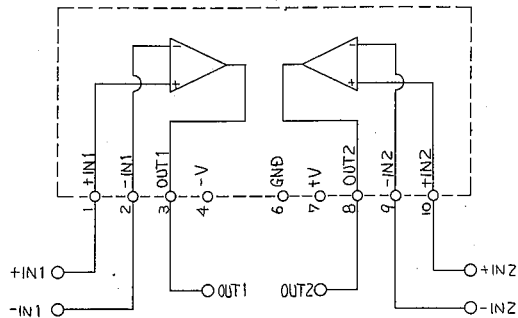
• **917089 (XK868C00)**
VCA



- (1) CV Fader MAX CV = $-0.5 \pm 0.01V$
VCA GROUP SW all OFF
- (2) OFFSET ① Fader MIN → OUT DC = V_{∞}
* repeat ② Fader 0dB → OUT DC = $V_{\infty} \pm 10mV$ (OFFSET A)
③ Fader MAX
VCA GROUP 1 SW ON (VCA MASTER Fader MAX)
→ OUT DC = $V_{\infty} \pm 10mV$ (OFFSET B)
- (3) THD IN 0dB 1kHz INPUT
* repeat ① Fader 0dB → THD $\leq 0.01\%$ <MIN> (THD 0)
② Fader MAX
VCA GROUP 1 SW ON (VCA MASTER Fader MAX)
→ THD $\leq 0.01\%$ <MIN> (THD 20)
- (4) $-\infty dB$ IN +20dB 1kHz INPUT
① Fader MIN → OUT AC $\leq -90dB$ ($-\infty dB$)

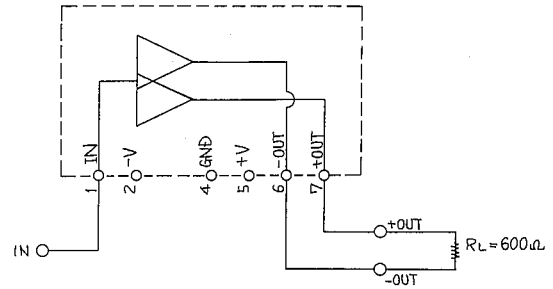
VCA GAIN	Rcv = 5K	-20dB/V
	CV = -1V	+20dB
	CV = 0V	0dB
	CV = +1V	-20dB

• **917038 (XK870A00)**
EBI



GAIN = -4.1dB

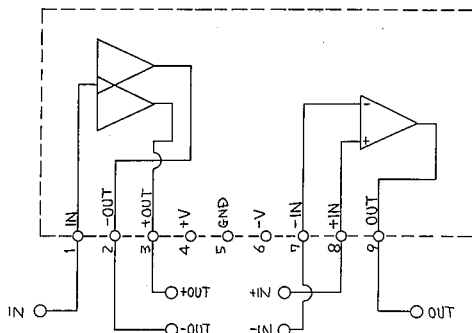
• **917040 (XK871A00)**
EBO



GAIN (Bal : $R_L = 600$) = 4.3dB
GAIN (-OUT short : $R_L = 600$) = 3.9dB
GAIN (+OUT short : $R_L = 600$) = 4.0dB

* $R_L = 10K$
GAIN (Bal) = 5.3dB
GAIN (-OUT short) = 4.8dB
GAIN (+OUT short) = 4.9dB

• **911306 (XK872A00)**
INS



(1) IN → +OUT
-OUT

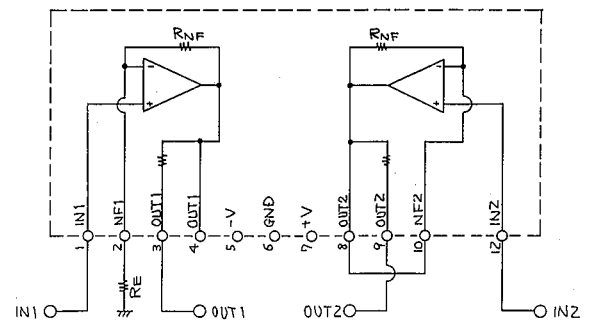
GAIN (Bal : $R_L = 10K$) = 4.3dB
(-OUT short : $R_L = 10K$) = 3.9dB
(+OUT short : $R_L = 10K$) = 3.9dB

(2) +IN → OUT
-IN

GAIN = -4.1dB

(3) IN → OUT
GAIN = 0.2dB

• **917037 (XK873A00)**
BA



(1) IN1 → OUT1

$$GAIN = 20 \times \log \left(1 + \frac{R_{NF}}{R_E} \right)$$

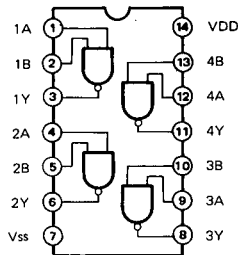
$$\therefore R_{NF} = 11K$$

$$GAIN = 20 \times \log (1 + 11K/R_E)$$

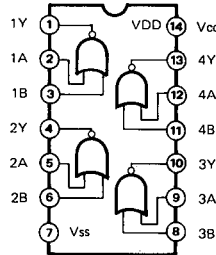
(2) IN2 → OUT2

OdB Buffer Amp

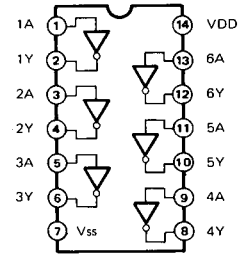
- **SN74HC00N** (IR000050)
- **SN74HC03N** (IR000350)
Quad 2 Input NAND



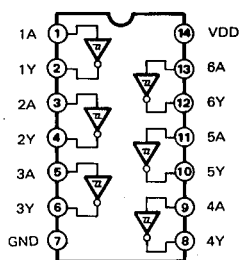
- **SN74HC02N** (IR000250)
Quad 2 Input NOR



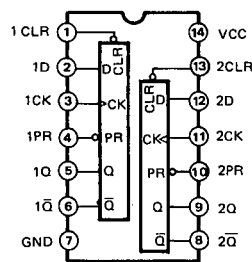
- **SN74HC04N** (IR000450)
Hex inverter



- **SN74HC14N** (IR001450)
Hex Inverter

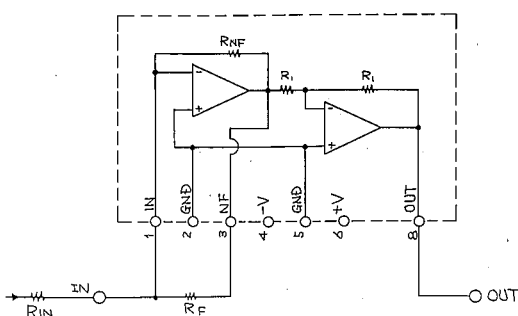


- **SN74HC74N** (IR007450)
Dual D-Type Flip-Flop



INPUTS				OUTPUTS	
PR	CLR	CLK	D	Q	Q-bar
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	X	Q _o	Q _o

- **917091** (XK869A00)
SUM



$$\text{GAIN} = 20 \times \log \left(\frac{R_{NF}}{R_{IN} \times 1 + \frac{R_{NF}}{R_F}} \right)$$

$$\therefore R_{NF} = 56K$$

$$\text{GAIN} = 20 \times \log \left(\frac{56K}{R_{IN}(1 + 56K/R_F)} \right)$$

$$\ast R_F = \infty$$

$$\text{GAIN} = 20 \times \log (56K/R_{IN})$$

■ PM4000M INSPECTIONS

1 PREPARATIONS

- 1) Connect the PM4000M and a PW4000 via the supplied DC power supply cable.
- 2) Unless specified, the applied signal should be a sine wave of 1 kHz, -80 dBs and the impedance of the signal source should be 150 ohms.

The load resistance of each output terminal should be as follows:

PHONES(L,R)	8 ohms (greater than 5 W)
All INSERT OUT	10 kohms
Other outputs	600 ohms

- 3) The signal level referred to in this specifications is 0 dBs = 0.775 V.

- 4) Unless specified, controls and switches must be set as follows:

CH INPUT (1-36,44,52)

+48V switch	OFF
GAIN trim	MAX (-70dB)
PAD (30dB) switch	OFF
ϕ switch	OFF (Positive phase)

EQ (HI,HI-MID,LO-MID,LO)

LEVEL control	CENTER
FREQ control	MIN
Q control	CENTER
ON switch	OFF

(HI,LO)

SHELF switch	OFF (PEAK)
HPF FREQ control	MIN
HPF switch	OFF
INSERT ON switch	ON during measurement only, OFF at all other times.
INSERT PRE switch	OFF (POST)

GROUP 1-18

LEVEL control	MAX
PRE/OFF/POST switch	PRE or POST during measurement only, OFF at all other times.

ST 1,2

LEVEL(LEVEL L) control	MAX
PAN(LEVEL R) control	CENTER
PRE/OFF/POST switch	PRE or POST during measurement only, OFF at all other times.
LEVEL/PAN switch	PAN
METER PRE switch	OFF (POST)
ON switch	ON for measuring CH only, OFF for all others.
VCA GROUP (1-8) switch	OFF
MUTE GROUP (1-8) switch	OFF
MUTE SAFE switch	OFF
CUE switch	ON for measuring CH only, OFF for all others.
Fader	MAX

MASTER

GROUP (1-18)

EQ (HI,HI-MID,LO-MID,LO)

LEVEL control	CENTER
FREQ control	MIN
Q control	CENTER
ON switch	OFF

INSERT switch

GROUP TO ST

ST1/OFF/ST2 switch	ST1 or ST2 during measurement only, OFF at all other times.
PAN control	CENTER
CUE switch	ON during measurement only, OFF at all other times.
ON switch	ON during measurement only, OFF at all other times.
ST switch	ON during measurement only, OFF at all other times.
Fader	MAX

STEREO

EQ (HI, HI-MID, LO-MID, LO)

LEVEL control CENTER

FREQ control MIN

Q control CENTER

ON switch OFF

INSERT switch ON during measurement only, OFF at all other times.

CUE switch ON during measurement only, OFF at all other times.

MIX switch ON during measurement only, OFF at all other times.

ON switch ON during measurement only, OFF at all other times.

L Fader MAX

R Fader MAX

TALKBACK

ASSIGN switch ON during measurement only, OFF at all other times.

TB OUT switch ON during measurement only, OFF at all other times.

OSC OUT switch OFF

OSC switch OFF

OSC FREQ control MIN

SWEEP switch OFF

OSC LEVEL control MAX

+48V switch OFF

+4dB switch OFF (-50dB)

TB LEVEL control MAX

ON/OFF/ON switch ON during measurement only, OFF at all other times.

CUE

SELECT switch OFF(CUE A), ON(CUE B)

ON during measurement only

ON switch ON during measurement only, OFF at all other times.

LEVEL control MAX (both A and B)

PHONES LEVEL control MAX

LAST CUE switch OFF

Others

VCA MASTER Fader (1-8) MAX

VCA MUTE (1-8) switch ON during measurement only, OFF at all other times.

MUTE MASTER (1-8) switch ON during measurement only, OFF at all other times.

METER SELECT switch TB/OSC:OFF, CUE:OFF

PHANTOM MASTER switch OFF

VCA CONTROL switch (1-4) OFF

VCA CONTROL switch (5-8) OFF

MUTE CONTROL switch (1-4) OFF

MUTE CONTROL switch (5-8) OFF

FAN LOW/HIGH switch LOW

CUE OFF/CONNECT switch OFF

2 GAIN

In status 1, the output level should be within the range given in Tables 2-1 to 2-8.

Table 2-1 Input Terminal [INPUT CH 1 to 36, 44, 52] Units: dBs

INPUT LEVL	GAIN CTRL	30dB PAD	INSERT OUT	DIRECT OUT	CUE OUT (L,R)
-70	MAX	OFF	$+4 \pm 2$	$+4 \pm 2$	$+14 \pm 2$ *1
-40	MAX	ON	----	----	$+14 \pm 2$ *1
-20	MIN	OFF	----	----	$+14 \pm 2$ *1

*1 CUE switch should be turned ON.

The difference in level between INPUT (CH 1 to 36, 44, 52) of each output should be less than 2 dB.

The difference in level between GROUP OUT (1 to 8), STEREO OUT (1, 2) (L, R), and CUE OUT (A, B) (L, R) should be less than 2 dB.

Table 2-2 Input Terminal [INPUT CH 1 to 36, 44, 52] Units: dBs

INPUT LEVEL	GAIN CTRL	30dB PAD	GROUP & ST PRE/POST/OFF SW	ST(1,2) LEVEL/PAN SW	GROUP OUT (1-18)	ST(1,2) OUT(L,R)
-30	MIN	OFF	PRE	PAN	$+10 \pm 2$	$+7 \pm 2$
-30	MIN	OFF	POST	PAN	$+20 \pm 2$ *1	$+17 \pm 2$ *1
-30	MIN	OFF	PRE	LEVEL	----	$+10 \pm 2$ *2

*1 Measuring can be performed at either one of the output terminals of GROUP OUT (1 to 18) and one of ST OUT (1,2) (L,R).

*2 Maximize the channel PAN R control.

The difference in level between GROUP OUT (1 to 18), ST (1, 2) (L, R) should be less than 2 dB.

Table 2-3 Input Terminal [TB IN] Units: dBs

INPUT TERMINAL	INPUT LEVLE	GROUP OUT(1-18)	ST(1,2) OUT(L,R)	TB OUT
TB IN	-60	$+14 \pm 2$	$+14 \pm 2$	$+4 \pm 2$

The difference in output levels between each output should be less than 2 dB.

Table 2-4 Output Terminal [CUE A, B] Units: dBs

INPUT TERMINAL	MASTER CUE switch	INPUT LEVEL	OUTPUT TERMINAL	OUTPUT LEVEL
GROUP (1-18) SUB IN	GROUP CUE ON	-6.0	CUE A (L,R)	$+14 \pm 2$ *1
ST1,2 SUB IN *2	ST CUE ON	-6.0	CUE A (L,R)	$+14 \pm 2$ *1
GROUP (1,2) SUB IN	GROUP CUE ON	-6.0	CUE B (L,R)	$+14 \pm 2$ *3

*1 At this time, check that the outputs are obtained at both L and R of CUE A.

Turn the ST switch of a MASTER module on and apply a signal to the GROUP 1, 3, 5, 17, then the output is obtained at the L channel of the CUE A.

Turn the ST switch of a MASTER module on and apply a signal to the GROUP 2, 4, 6, 18, and check that the output is obtained at the R channel of the CUE A.

*2 At this time, turn on the MIX switch, and check that the output level should be -3 dB, with the level when MIX is off as the reference.

When same signals are applied to the L and R inputs, the output level should be +3 dB, with the level when MIX is off as the reference.

*3 Turn the CUE SELECT switch on (set to select B). At this time, check that the outputs are obtained at both L and R of CUE B.

Turn the ST switch of a MASTER module on and apply a signal to the GROUP 1, then the output is obtained at the L channel of the CUE B.

Turn the ST switch of a MASTER module on and apply a signal to the GROUP 2, and check that the output is obtained at the R channel of the CUE B.

The difference in levels between L and R outputs should be less than 2 dB.

Table 2-5 Output Terminal [ST1, 2 (Group to ST)] Units: dBs

INPUT TERMINAL	INPUT LEVEL	OUTPUT TERMINAL	OUTPUT LEVEL
GROUP (1-18) SUB IN	-6.0	ST1,2 (L,R)	+14±2

Set the GROUP TO ST switch to ST1.

When the PAN control is rotated fully counterclockwise, the output level of the ST1 L should be +3 dB, and the leakage level to R should be less than -50 dBs.

Also, if the PAN control is rotated fully clockwise, the output level of ST1 R should be +3 dB, and the leakage level to L should be less than -50 dBs.

Set the GROUP TO ST switch to ST2 and perform the inspection of ST2 in the similar manner.

Table 2-6 Input Terminal [INSERT] Units: dBs

INPUT TERMINAL	INPUT LEVEL	GROUP OUT(1-18)	ST(1,2) OUT(L,R)
CH(1-36,44,52)	-6	+20±2 *1	-----
GROUP (1-18)	+4	+14±2	-----
ST(1,2) (L,R)	+4	-----	+14±2

*1 Measuring can be performed at either one of the output terminals of GROUP OUT (1 to 18).

The difference in level between INPUT (1 to 36,44,52) of each output should be less than 2 dB.

The difference in level between GROUP OUT (1 to 18), ST OUT (1, 2) (L, R) should be less than 2 dB.

Table 2-7 Input Terminal [SUB IN] Units: dBs

INPUT TERMINAL	INPUT LEVEL	GROUP OUT(1-18)	ST(1,2) OUT(L,R)	CUE A OUT(L,R)
GROUP (1-18)	+4	+14±2	-----	-----
ST(1,2) (L,R)	+4	-----	+14±2	-----
CUE (L,R)	+4	-----	-----	+14±2

Check that the output of +4 ±2 dBs is obtained at each INSERT OUT.

The difference in level between GROUP OUT(1 to 18), ST OUT (1, 2) (L, R) and CUE A OUT (L, R) should be less than 2 dB.

Table 2-8

CUE A OUT (L,R)	PHONES 1,2(L,R)
+4dBs	0±2dBs

The PHONES output given in Table 2-8 should be obtained when the output level of CUE A is +4 dBs.

The difference in level between PHONES L and R outputs should be less than 2 dB.

3 FREQUENCY CHARACTERISTICS

If the applied signal frequencies are 20 Hz, 20 kHz in status 1, the output level of each output should be within 0 +1/-3 dB with the level at 1 kHz used as reference.

When the applied signal frequency is 20 Hz, the PHONES output level should be within -2 ±2 dB.

4 EQ CHANGE CHARACTERISTICS

When each of the EQ controls of INPUT, MASTER and STEREO MASTER modules are operated in status 1, the output level of each frequency should fall within the range given in Table 4-1 to Table 4-4, with the output level when the control is set in the middle as a reference.

There is no SHELF switch on a MASTER and STEREO MASTER, so the output is the level when the SHELF switch is off.

If an output level is more or less than the rated range, vary the frequency of the applying signal within ± 20 %. If this output level is within the rated value given in Tables, then it is acceptable.

The output should be measure at GROUP OUT (1) when performing the inspections of the INPUT module.

The output should be measure at each GROUP OUT when inspecting the MASTER module.

The output should be measure at each STEREO OUT when inspecting the STEREO MASTER module.

Table 4-1 [HI] Units: dB

GAIN	FREQ	Q	SHELF	1kHz	5kHz	20kHz
MIN	MIN	MIN	OFF	-15 ± 2	----	----
MAX	MAX	MIN	OFF	----	$+1 \pm 2$	$+15 \pm 2$
MAX	MAX	MIN	ON	----	----	$+12 \pm 2$
MAX	MAX	MAX	OFF	----	$+10 \pm 2$	$+15 \pm 2$

Table 4-2 [HI-MID] Units: dB

GAIN	FREQ	Q	400Hz	2kHz	8kHz
MIN	MIN	MIN	-15 ± 2	----	----
MAX	MAX	MIN	----	$+1 \pm 2$	$+15 \pm 2$
MAX	MAX	MAX	----	$+10 \pm 2$	$+15 \pm 2$

Table 4-3 [LO-MID] Units: dB

GAIN	FREQ	Q	80Hz	400Hz	1.6kHz
MIN	MIN	MIN	-15 ± 2	----	----
MAX	MAX	MIN	----	$+1 \pm 2$	$+15 \pm 2$
MAX	MAX	MAX	----	$+10 \pm 2$	$+15 \pm 2$

Table 4-4 [LO] Units: dB

GAIN	FREQ	Q	SHELF	30Hz	160Hz	600Hz
MIN	MIN	MIN	OFF	-15 ± 2	----	----
MAX	MAX	MIN	OFF	----	$+1 \pm 2$	$+15 \pm 2$
MAX	MAX	MIN	ON	----	----	$+12 \pm 2$
MAX	MAX	MAX	OFF	----	$+10 \pm 2$	$+15 \pm 2$

5 HPF CHANGE CHARACTERISTICS

In status 1, if the HPF switch of INPUT is switched on and HPF-f control is operated, the output level of GROUP OUT (1) should be within the range given in Table 5, with the level when HPF is off as the reference.

Table 5

HPF FREQ	20Hz	400Hz
MIN	-3 ± 2	----
MAX	----	-3 ± 2

6 SEPARATION

In INPUT module, if the output level of GROUP OUT (1) set at +20 dBs in status 1, the leakage level to GROUP OUT (2-18) should be less than -50 dBs.

Inspection of GROUP OUT (2-18) and ST (1, 2) (L, R) can be performed in a similar manner.

7 VCA MUTING

In status 1, apply a signal of -50 dBs to each input terminal of INPUT (CH 1 to 36, 44, 52) and minimize the FADER control, and check that the output level of each GROUP OUT (1) should be less than -60 dBs.

8 METER LED LIGHT-UP LEVEL

Turn the MT PRE switch on and apply a signal to each of INPUT in status 1, each LED of channel level meter should light up within the range given in Table 8.

Table 8 Units: dBs

INSERT OUT	-20	-10	-6	0	6	PEAK
OUTPUT LEVEL	-16 ± 2	-6 ± 2	-2 ± 2	$+4 \pm 2$	$+10 \pm 2$	$+23.5 \pm 2$

9 PEAK LED LIGHT-UP (METER)

In status 1, apply a signal to each INPUT, PEAK LED of channel level meter should light up within $+23.5 \pm 2$ dBs.

When the EQ switch is turned on and HIGH level control is minimized, the PEAK LED should light up within -15 ± 4 dB with the level of $+23.5 \pm 2$ dBs used as reference.

10 DISTORTION FACTOR

Minimize the GAIN control and set each of FADER and level controls in INPUT (1) and MASTER at the NOMINAL POSITION in status 1. When a $+14$ dBs output is obtained at each output terminal of GROUP OUT (1 to 18), ST (1, 2) (L, R), CUE (A, B) (L, R) and TB OUT, the distortion factor should be less than 0.01 %. When you measure the distortion factor at the TB OUT, switch the +4 switch on.

Apply a signal to the CUE SUB IN L. And then, check that when 0 dBs output is obtained at each terminal of PHONES (1, 2) L, the distortion factor obtained at each terminal should be less than 0.7 %.

Check for the same at the PHONES (1, 2) R while applying a signal to the CUE SUB IN R.

11 MAXIMUM OUTPUT

When $+24$ dBs output is obtained at each output terminal of GROUP OUT (1 to 18), ST OUT (1, 2) (L, R), CUE (A, B) (L, R) and TB OUT in status 1, check that the distortion factor should be less than 1 %.

Also, check that the distortion factor should be less than 1 % when $+3$ dBs is obtained at each output terminal of PHONES (1, 2) (L,R).

12 VU Meter

When $+4$ dBs output is obtained at each output of GROUP OUT (1 to 18), ST OUT (1, 2) (L, R) in status 1, the indication on the VU meter should be within 0 ± 1 VU.

When the meter selector switch is changed over to each output, the VU meter indication should be within 0 ± 1 VU.

<PM4000M-36 METER SELECT>

When the TB/OSC switch is turned on, meters of GROUP (15 to 18) are assigned to ST (1, 2) (L,R). At that time, the ST LED on the meter panel should light up.

When the TB OUT and TB ON switches are simultaneously turned on, or OSC OUT and OSC ON are simultaneously turned on, while the TB/OSC is on, the meter of GROUP OUT (11) is assigned to TB, and GROUP (12) is assigned to OSC. At that time, the TB/OSC LED on the meter panel should light up.

When the CUE switch is turned on, the meter of GROUP (13) is assigned to CUE L, and GROUP (14) is to CUE R.

<PM4000M-44/52 METER SELECT>

When the TB/OSC switch is turned on, meter of GROUP (11) is assigned to TB, and GROUP (12) is assigned to OSC.

When the CUE switch is turned on, the meter of GROUP (13) is assigned to CUE L and GROUP (14) is to CUE R.

If the VU meter indication is not within the rated value, adjust the trimmer potentiometer so that the indication should be within 0 ± 1 VU.

Also, check that the red PEAK LED lights up when the output level is within $+23.5 \pm 2$ dBs.

13 NOISE LEVEL

When the HOT, COLD of each input terminal of INPUT is shorted with an 150 ohms in status 1, check that the noise level at GROUP OUT (1) should be less than -28 dBs.

* If the noise level is more than -28 dBs, find the noise level by input conversion. If this noise level is less than -128 dBs, then it is acceptable.

When the input terminal of TB INPUT is shorted with an 150 ohms, the noise level at GROUP OUT (1) should be less than -64 dBs.

* If the noise level is more than -64 dBs, find the noise level by input conversion. If this noise level is less than -128 dBs, then it is acceptable.

14 RESIDUAL NOISE

Set the FADER and SEND level controls of all INPUT at MIN and turn assign switches off, in status 1, and turn the ON switch of each output of MASTER on.

In this state, set the MASTER FADER at maximum or minimum, check that the noise level should fall within the levels shown in Table 14.

Table 14 Residual Noise

Units: dBs

GROUP & STEREO FADER CUE VOLUME	GROUP OUT(1-18)	ST OUT(1,2) (L,R)	CUE OUT(A,B) (1-8)	TB OUT	OSC OUT	PHONES OUT(L,R)
MAXIMUM	-71	-70	-73	---	---	---
MINIMUM	-100	-100	-100	-93	-93	-82

15 PHASE

The signal phase applied to each input terminal and the signal phase obtained at each output terminal should be the same. And check that the applied signal to each input terminal and the signal obtained at each output terminal should be in negative phase when the PHASE SW of INPUT is switched on.

* Pin polarity of balanced type input / output terminal

(XLR type)	(PHONE type)
PIN 1: GND	T: HOT (+)
PIN 2: HOT (+)	R: COLD (-)
PIN 3: COLD (-)	S: GND

16 OSCILLATOR

Turn on TB OUT, OSC OUT and "10kHz" switches in status 1, the output levels of TB OUT and OSC OUT are $+14 \pm 2$ dBs. Check for the same at "1kHz", "100Hz" and "PINK".

At this time, check that the distortion rates of "10kHz", "1kHz" and "100Hz" should be less than 1 %.

Check that the output levels and frequencies of TB OUT and OSC OUT are within the range given in Table 16, when the SWEEP switch and OSC FREQ control are changed.

Table 16

OSC SW	OSC FREQ CTRL: MIN		OSC FREQ CTRL: MAX		SWEEP SW. OFF
	LEVEL (dB)	FREQ. (Hz)	LEVEL (dB)	FREQ. (Hz)	
10kHz	$+14 \pm 2$	$2\text{kHz} \pm 20\%$	$+14 \pm 2$	$20\text{kHz} \pm 20\%$	$10\text{kHz} \pm 20\%$
1kHz	$+14 \pm 2$	$200\text{Hz} \pm 20\%$	$+14 \pm 2$	$2\text{kHz} \pm 20\%$	$1\text{kHz} \pm 20\%$
100Hz	$+14 \pm 2$	$20\text{Hz} \pm 20\%$	$+14 \pm 2$	$200\text{Hz} \pm 20\%$	$100\text{Hz} \pm 20\%$

The OSC ON LED indicator should light until the OSC switch is turned off.

17 CUE

<INPUT CUE PRIORITY>

Check that the INPUT CUE indicator should light up when either one of the CUE switches of INPUT is turned on.

Also, if the CUE/SOLO OFF/CONNECT switch is turned to CONNECT and pin 22 of the EXT CONTROL connector is short-circuited to ground, INPUT CUE indicator should light up.

Check that INPUT CUE indicator goes off when the CUE/SOLO OFF/CONNECT switch is turned to OFF. At this time, the signals from CUE switches of MASTER and STEREO MASTER are muted.

<CUE LOGIC CONTROL> (MASTER CUE only)

* CUE MIX MODE

In status 1, turn the CUE switches of MASTER and STEREO MASTER on, and check that the LED in the CUE switch which is turned on will light up, and output from CUE OUT is mixed with signals from each of GROUP and STEREO.

* LAST CUE MODE

Press the LAST CUE and CUE switches of MASTER and STEREO MASTER on, and check that the LED in the CUE switch which was lately pressed lights up and other CUE LEDs go off.

Check that the signal from the module whose LED has lit up will output to the CUE OUT. If the CUE ST switch of the MASTER is turned on, the CUE mode of the module is set to the CUE MIX, and the ODD is assigned to the L channel and the EVEN is to R.

When you switch the LAST CUE off again, the LED in CUE switch will go off and the output from the CUE OUT should be cut off.

* CUE RESET

Check that LEDs in all CUE switches of MASTER and STEREO MASTER go off at each time the LAST CUE is switched on/off and the output from the CUE OUT should be cut off.

In LAST CUE mode, when the CUE ST switch is turned off, the CUE RESET could work.

18 VCA CONTROL

When only one of the VCA GROUP switches (1 to 8) in each of INPUT is turned on under condition in status 1, the output level of GROUP OUT (1) is $+10 \pm 2$ dB with the level when the switch is off as the reference. And turn on a switch of VCA GROUP (1 to 8) switches, and turn on the same number switch of MUTE (1 to 8) of INPUT, the output level of GROUP OUT (1) is less than -80 dB, with the level when the switch is off as the reference.

Check that when all of VCA MASTER (1 to 8) faders are minimized and only one of the VCA GROUP switches (1 to 8) in each INPUT is turned on, the output level of GROUP OUT (1) is less than -80 dB, with the level when the switch is off as the reference.

The NOMINAL LED should light up within the range of 0 ± 1 dB on the panel scale.

19 MUTE CONTROL

Turn on the ON switch in all INPUTS.

And, turn on a switch of MUTE MASTER (1 to 8) switches, and turn on the same number switch of MUTE (1 to 8) of INPUT, check that the ON LED of that number module should go off. At this time, the signal should be muted from the module whose ON LED has gone off.

When the MUTE SAFE switch is turned on under this condition, MUTE should be canceled.

20 EXTERNAL VCA CONTROL

When VCA CONTROL switches (1–4) and (5–8) are set at MASTER, and each of the VCA MASTER faders (1 to 8) is operated, the output within the range given in Table 20 should be obtained at each VCA BUS terminal of the EXTERNAL CONTROL connector.

Check that the output in the range of 0 ± 0.5 V can be obtained, regardless of the VCA MASTER fader when the VCA CONTROL switches are turned to SLAVE. And, when they are set to OFF, it is released.

Table 20

VCA MASTER FADER	VOLTAGE
MAX	$+0.5 \pm 0.05$ V
MIN	less than -9 V

21 EXTERNAL MUTE CONTROL

Turn each ON switch of INPUT (1 to 8) on, and turn on the MUTE switch matching the appropriate channel number. And, set the MUTE CONTROL switches (1–4) and (5–8) to SLAVE.

When each of the MUTE buses (1 to 8) of the MUTE CONTROL connector is successively short-circuited to ground, that the corresponding grounded channel is muted.

When the MUTE CONTROL switches (1–4) and (5–8) are set to SLAVE, the INPUT module should not be muted even if the MUTE MASTER switch is turned on.

22 PHANTOM

Connect a load resistance (10 kohms, 1 W or greater) between the input connector pins 1 and 2 of each INPUT and TB, and short pins 2 and 3.

When the PHANTOM MASTER is switched on, and +48V switch of each module is turned on, a voltage of $+35 \pm 3$ V should be obtained at both ends of the load resistance.

23 LAMP POWER SUPPLY

When the load resistance (3 kohms, 5 W or greater) is connected between the XLR connector pins 3 and 4, and the LAMP DIMMER is operated, the voltage at both ends of the load resistance should be within the range given in the Table 23.

LAMP DIMMER	VOLTAGE
MAX	$+11 \pm 1$ V
MIN	$+2 \pm 1$ V

24 FAN SPEED SWITCH

When the FAN switch is switched to LOW/HIGH, the operating speed of the mounted cooling fans is set at LOW/HIGH.

25 POWER INDICATOR

Check that +12V, +19V, -19V and +48V LED indicators light up green in status 1. When the PHANTOM MASTER is turned on, the color of the +48V LED should change to red.

Check that when the POWER switch is turned on, the PW CAUTION LED lights up red just a second, and then goes right back off.

26 POWER SUPPLY VOLTAGE FLUCTUATION

Even a fluctuation of $\pm 10\%$ in the rated power supply voltage should pose no problems in the operations.

27 MEASURING EQUIPMENT

- * The balanced output type oscillator is to be used.
- * The output impedance of the oscillator should be less than 10 ohms.
- * The input impedance of the oscilloscope and the level meter should be more than 100 kohms.
- * Noise level should be measured using a 12.7 kHz, -6 dB/oct. low-pass filter.
- * We recommend that balanced input type measuring instruments are to be used.

PM4000M ADJUSTMENTS

1 INPUT MODULE

1-1 PREPARATIONS

- 1) Connect the PM4000M and a PW4000 via the supplied DC power supply cable.
- 2) Unless specified, the applied signal should be a sine wave of 1 kHz, -70 dBs.
- 3) The signal level referred to in this specifications is 0 dBs = 0.775 V.
- 4) Unless specified, controls and switches must be set as follows:

+48V switch	OFF
GAIN trim	MIN
PAD (30dB) switch	OFF
ϕ switch	OFF (Positive phase)
EQ (HI, HI-MID, LO-MID, LO)	
LEVEL control	CENTER
FREQ control	MIN
Q control	CENTER
ON switch	OFF
(HI, LO)	
SHELF switch	OFF (PEAK)
HPF FREQ control	MIN
HPF switch	OFF
INSERT ON switch	OFF
INSERT PRE switch	OFF (POST)
GROUP 1 ~18	
LEVEL control	MAX
PRE/OFF/POST switch	OFF
ST 1,2	
LEVEL(LEVEL L) control	MAX
PRE/OFF/POST switch	OFF
PAN(LEVEL R) control	CENTER
LEVEL/PAN switch	PAN
METER PRE switch	ON (PRE)
ON switch	ON
VCA GROUP (1-8) switch	OFF
MUTE GROUP (1-8) switch	OFF
MUTE SAFE switch	OFF
CUE switch	ON
Fader	MAX
Internal switch	Set at the "▼" mark

Unless specified, internal switches must be set as follows:

[S1]-[S10]	OFF
[S11]	OFF (+0.5)

1-2 STEP 1: VCA STANDARD VOLTAGE ADJUSTMENT

Adjust the trimmer potentiometer so that the voltage is -0.5 ± 0.01 V obtained at test point T102, under the conditions given in status 1-1.

Table 1-2

MEASURE AT	VOLTAGE	TRIMMER POT.
TP102 on IN3 board	-0.5 ± 0.01 V	VR126 on IN3 board

1-3 STEP 2: VCA OFFSET ADJUSTMENT

Set the fader to " ∞ ", apply no signal, and adjust the trimmer potentiometer so that the voltage obtained at the test point TP101 falls within the range shown in Table 1-3.

Table 1-3

MEASURE AT	VOLTAGE	TRIMMER POT.
TP101	$0V \pm 5mV$	VR132 [$-\infty$ ADJ] on IN1 board

1-4 STEP 3: VCA OFFSET A ADJUSTMENT (When GAIN is 0 dB.)

Set the fader to "0", apply no signal, and adjust the trimmer potentiometer so that the voltage obtained at the test point TP101 falls within the range shown in Table 1-4.

Table 1-4

MEASURE AT	VOLTAGE	TRIMMER POT.
TP101	$0V \pm 10 mV$	VR128 [OFFSET A] on IN1 board

1-5 STEP 4: VCA OFFSET B ADJUSTMENT (When GAIN is +20 dB.)

Set the fader to "10", apply $0.5 \pm 10 mV$ DC to VCA CONTROL 1 terminal from an external device, and turn on the VCA GROUP ASSIGN 1 switch. Adjust the trimmer potentiometer so that the voltage obtained at the test point TP101 falls within the range shown in Table 1-5.

Table 1-5

MEASURE AT	VOLTAGE	TRIMMER POT.
TP101	$0V \pm 10 mV$	VR131 on [OFFSET B] IN1 board

Repeat the adjustment to both OFFSET A and OFFSET B until both adjusted values are satisfied.

A $0.5 \pm 10 mV$ can be applied via the VCA control bus of the MASTER module which the inspection and adjustment has been performed.

To apply the $0.5 \pm 10 mV$ DC, press on either one of VCA GRUOP (1 to 8) switches and set the INPUT fader to MAX, and set the same numeber VCA MASTER fader to MAX.

1-6 STEP 5: DISTORTION ADJUSTMENT (When GAIN is 0 dB.)

Set the GAIN control to MIN, turn on the channel ON switch, set GROUP 1 LEVEL control to MAX, and turn the PRE/OFF/POST switch of the GROUP 1 to POST.

Adjust the input signal level so that the output signal level is +20 dB at the test point TP103.

Set the fader to "0", and adjust the trimmer potentiometer so that the distortion rate obtained is the value shown in Table 1-6.

Table 1-6

MEASURE AT	DISTORTION RATE	TRIMMER POT.
TP103	The best value	VR129 [THD 0] on IN1 board

1-7 STEP 6: DISTORTION ADJUSTMENT (When GAIN is +20 dB.)

Under the conditions given in 1-6, adjust the input signal level so that the output signal level is +20 dB at the test point TP103.

Set the fader to "10", apply a $0.5 \pm 10 mV$ DC to VCA 1 terminal from an external device, and turn on the VCA GROUP ASSIGN 1 switch. Adjust the trimmer potentiometer so that the distortion rate obtained is the value shown in Table 1-7.

Table 1-7

MEASURE AT	DISTORTION RATE	TRIMMER POT.
DIRECT OUT	The best value	VR130 [THD 20dB] on IN1 board

Repeat the adjustment so that the distortion rate is 0.01% or less when GAIN is 0 dB and also when GAIN is +20B.

A 0.5 ± 10 mV can be applied via the VCA control bus of the MASTER module which the inspection and adjustment has been performed.

To apply the 0.5 ± 10 mV DC, press on either one of VCA GRUOP (1 to 8) switches, set the INPUT fader to MAX, and set the same numeber VCA MASTER fader to MAX.

1-8 STEP 7: VCA MUTE

Set the GAIN control to MIN, and set the input signal level to 0 dBs (which is the level to obtain +20 dB at TP103 when the fader is set at NOMINAL position), and set the fader to " ∞ (infinite)".

Adjust the trimmer potentiometer so that the waveform amplitude of the output signal obtained at the test point TP103 is the minimum, at this point.

Table 1-8

MEASURE AT	VOLTAGE	TRIMMER POT.
TP103	less than -90 dBs (110 dB)	VR132 [- ∞ ADJ] on IN1 board

1-9 LED (METER, PEAK) LIGHTING LEVEL

Turn on the MTR PRE switch to apply the signal, under the conditions given in status 1-1, and adjust the trimmer potentiometer so that the LED "0" lights up when the output level of INSERT OUT is +4 dBs.

Check that LED "0" goes off when the input signal level is decreased by 1 dB.

Table 1-9-1

MEASURE AT	TRIMMER POT.
INSERT OUT	VR125 on IN3 board

(Load resistance of the INSERT OUT terminal should be 10 kohms or higher.)

Check that other LEDs light up within the range given in the Table 9-1-2.

Table 9-1-2

INSERT OUT	-20	-10	-6	0	6	HA & EQ PEAK
OUTPUT LEVEL	-16 ± 2	-6 ± 2	-2 ± 2	$+4 \pm 2$	$+10 \pm 2$	$+23.5 \pm 2$

2 MASTER MODULE

2-1 PREPARATIONS

1) Connect the PM4000M and a PW4000 via the supplied DC power supply cable.

2) Unless specified, the applied signal should be a sine wave of 1 kHz, -70 dBs.

3) The signal level referred to in this specifications is 0 dBs = 0.775 V.

4) Unless specified, controls and switches must be set as follows:

GROUP (*1,*2)

EQ control MIN

EQ switch OFF

PAN(G to ST) control CENTER

GROUP TO ST

ST1/OFF/ST2 switch ST1 or ST2 during measurement only, OFF at all other times.

INSERT switch ON during measurement only, OFF at all other times.

CUE switch ON during measurement only, OFF at all other times.

ON switch ON during measurement only, OFF at all other times.

Fader MAX

CUE

ST switch OFF

VCA MASTER (MAS1 only)

Fader MAX

VCA MUTE switch ON during measurement only, OFF at all other times.

MUTE MASTER (MAS2 only)

MUTE switch ON during measurement only, OFF at all other times.

[S1]–[S3] OFF

INTERNAL SW set at the "▼" mark

2-2 VCA CONTROL

Set the VCA MASTER fader to MAX under the condition given in 2-1.

Adjust the trimmer potentiometer VR301 on the MAS2 circuit board so that the voltage obtained at the test point TP301 (VCA CONTROL MASTER) falls within $+0.5 \pm 0.01$ V.

When the VCA MASTER fader is set to MIN, the voltage at TP301 should be less than -9 V.

Check that the NOMINAL LED lights up when the voltage obtained at TP301 falls within 0 ± 60 mV.

The voltage becomes -9 V or less when the VCA MUTE switch is turned on.

3 TALKBACK MODULE

3-1 PREPARATIONS

- 1) Connect the PM4000M and a PW4000 via the supplied DC power supply cable.
- 2) Unless specified, the applied signal to INPUT(TB) should be a sine wave of 1 kHz, -50 dBs, and the signal to INPUT(CUE SUB) should be a sine wave of 1 kHz, 0 dBs.
- 2) The signal level referred to in this specifications is 0 dBs = 0.775 V.
- 3) Unless specified, controls and switches must be set as follows:

ASSIGN switch ON during measurement only, OFF at all other times.

TB OUT switch ON

OSC OUT switch ON

OSC switch OFF

OSC FREQ control MIN

SWEEP switch OFF

OSC level control MAX

+48V switch OFF

+4dB switch OFF (-50 dB)

TB level control MAX

ON/OFF/ON switch ON during measurement only, OFF at all other times.

CUE

LAST CUE switch OFF

A/B switch OFF

ON switch ON during measurement only, OFF at all other times.

CUE level control (A,B) MAX

PHONES Level control MAX

METER SELECT SW OFF

3-2 Oscillator

Adjust the trimmer potentiometer VR203 (THD ADJ) so that the distortion rate of GROUP 1 terminal output signal is 1% or less (which is the minimum) when the TB ASSIGN switch (GROUP 1) and "1kHz" switch are turned on under the conditions

given in 2-1. Then, adjust the trimmer potentiometer VR204 (SINE LEVEL) so that the output level is 10 ± 0.5 dBs.

Adjust the trimmer potentiometer VR201 (PINK LEVEL) so that the output signal level is 10 ± 0.5 dBs when the "PINK" switch is turned on, under the conditions given.

4 MEASURING EQUIPMENT

- * The output impedance of the oscillator should be less than 10 ohms.
- * The input impedance of the oscilloscope and the level meter should be more than 100 kohms.
- * Noise level should be measured using a 12.7 kHz, -6 dB/oct. low-pass filter.

■ PW4000 INSPECTIONS AND ADJUSTMENTS

1. LINE VOLTAGE DISPLAY ADJUSTMENT

Check that only the LINE VOLTAGE display is operating when the LINE VOLTAGE INDICATOR switch on the rear panel is turned on, and the power switch is off.

Insert a screwdriver through the adjustment hole located at the lower left of the front panel, and adjust the trimmer potentiometer VR501 on the MON circuit board so that the LINE VOLTAGE display is within $\pm 1V$ of the primary power supply voltage value.

Turn off the LINE VOLTAGE INDICATOR switch when the adjustment is complete.

At this point, check that all the displays have gone off.

2. NO-LOAD CHECK

Connect the short testing connector (TX800290) to the DC OUTPUT terminal of PW4000, then turn on the power supply.

Check the followings.

- 1) Both the left and right fans should start rotating 1 to 3 seconds after the LINE VOLTAGE display appears.
- 2) The LEDs (green) +48, +12, +19, and -19 that indicate OPERATE status should light up 6 ± 2 seconds after the power supply is turned on.

3. THERMAL DISPLAY AND FAN OPERATING CHECKING

When the connector is removed from CN601 on the AC circuit board, with the short testing connector (TX800290) connected to the DC OUTPUT terminal of PW4000, check that the THERMAL LED (red) lights up and that the fan's rotation speed increases.

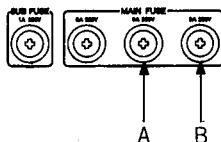
When the connector is connected to CN601, check that the THERMAL LED (red) goes off and that the fan's rotation speed decreases.

4. OPEN INSPECTION CIRCUIT CHECKING

Connect the short testing connector (TX800290) to the DC OUTPUT terminal of the PW4000, and remove the center fuse (A in the illustration) (there are three main fuses on the rear panel; be sure to remove the center one), then turn on the power supply.

At this point, the LEDs (Green) +48, +12, +19, and -19 that indicate OPERATE status should light up right away, then go off 1 to 5 seconds later.

Put the center fuse back in, remove the fuse on the right side of the three main fuses (B in the illustration), then check that the same results are obtained from the above inspection steps.



After the inspection is completed, put the removed fuse back in.

NOTE: If this inspection is carried out with the PM4000 main unit connected, current exceeding the fuse's capacity will flow through the fuse, which could weaken or deteriorate the fuse. If you have mistakenly performed the inspection with the PM4000 main unit connected, be sure to replace the fuse with a new one.

5. OUTPUT VOLTAGE ADJUSTMENT WHEN RATED VOLTAGE IS APPLIED OR WHEN VOLTAGE IS DECREASED

After connecting PM4000 and PW4000 via the supplied DC power supply cable, set the primary power supply voltage to the rated value by using an AC voltage adjuster.

Turn VR301 (LOW, ADJ) on the DC1 circuit board, and VR401 (LOW, ADJ) and VR403 (48V, ADJ) on the DC2 circuit board clockwise all the way to the end.

Under this condition, adjust each output voltage using the method shown in Table 1.

NOTE: (LOW, ADJ), (LOW, ADJ) and (48V, ADJ) are the printed indications on the surface of the board.

Table 1

Measurement point	Voltage value	Trimmer potentiometer for adjustment
+ 19 (DC1 board)	$+18.1 \pm 0.05$ V	VR302 (20V.ADJ) of DC1 board
+ 12 (DC2 board)	$+12.1 \pm 0.05$ V	VR402 (12V.ADJ) of DC2 board
+48 (DC2 board)	$+48 \pm 2$ V	Check only

Next, set the primary power supply voltage to 70% of the rated value by using the AC voltage adjuster.

Under this condition, adjust each output voltage using the method shown in Table 2.

As you turn the trimmer potentiometer counterclockwise from the fully clockwise position, remember that the voltage value will stay almost constant, then suddenly decrease. Also, check that the ripple voltage becomes lower than the specified value. (Although the ripple voltage is higher than the specified value before the adjustment, it should decrease to below the specified value after the adjustment.)

While making this adjustment, do not move the trimmer potentiometers VR302 and VR402, which were used for the adjustment shown in Table 1. If you have changed the settings of these resistors, redo the adjustment shown in Table 1.

Table 2

Measurement point	Voltage value	Ripple voltage	Trimmer potentiometer for adjustment
+ 19 (DC1 board)	A value 0.5 V lower than the result obtained by making the adjustment given in Table 1.	3 mVp-p	VR301 (LOW.ADJ) of DC1 board
- 19 (DC1 board)	Voltage checking is unnecessary.	3 mVp-p	Check only the ripple.
+ 12 (DC2 board)	A value 0.3 V lower than the result obtained by making the adjustment given in Table 1.	3 mVp-p	VR401 (LOW.ADJ) of DC2 board
+48 (DC2 board)	A value 2.0 V lower than the result obtained by making the adjustment given in Table 1.	3 mVp-p	VR403 (48V.ADJ) of DC2 board

Finally, return the primary power supply voltage to the rated value, and check that the voltage at each terminal is within the range shown in Table 3. Also check that the ripple voltage is 3mVp-p or less.

Table 3

Measurement point	Voltage value	Ripple voltage
+ 19 (DC1 board)	$+18.1 \pm 0.3$ V	3 mVp-p or less
- 19 (DC1 board)	-18.1 ± 0.3 V	3 mVp-p or less
+ 12 (DC2 board)	$+12.1 \pm 0.3$ V	3 mVp-p or less
+48 (DC2 board)	$+48 \pm 2$ V	3 mVp-p or less

6. CAUTION LED LIGHTING CHECK

When the connector is removed from CN104 on the AC circuit board, with PM4000 and PW4000 connected to each other via the supplied DC power supply cable, check that the PW CAUTION LED (red) of PM4000 lights up. Check that the LEDs (Green) +48, +12, +19, and -19 indicating OPERATE status of the PW4000 go off, and that the LED (red) indicating CAUTION status lights up, 2 ± 2 seconds after the PW CAUTION LED (red) lights up.

■ PM4000Mの検査

1 準備

- ・コンソール本体と電源(PW4000)を付属接続ケーブルで接続します。
- ・特に指定ない場合、加える信号は1kHz、-80dBsの正弦波で、信号源インピーダンスは150Ωとします。また、各出力端子の負荷抵抗は下記の通りです。

PHONES (L,R) 8Ω(5W以上)

全ての INSERT OUT 10kΩ

その他出力 600Ω

- ・信号レベルは、0dBs=0.775Vとします。
- ・特に指定のない場合、ツマミ類は以下のように設定して下さい。

•CH INPUT (1-36,44,52)

+48V switch OFF

GAIN trim MAX (-70dB)

PAD (30dB) switch OFF

φ switch OFF (正相)

EQ (HI,HI-MID,LO-MID,LO)

LEVEL control CENTER

FREQ control MIN

Q control CENTER

ON switch OFF

(HI,LO)

SHELF switch OFF (PEAK)

HPF FREQ control MIN

HPF switch OFF

INSERT ON switch 測定時のみON、他はOFF

INSERT PRE switch OFF (POST)

GROUP 1-18

LEVEL control MAX

PRE/OFF/POST switch 測定時のみPRE、またはPOST。他はOFF

ST 1,2

LEVEL(LEVEL L) control MAX

PAN(LEVEL R) control CENTER

PRE/OFF/POST switch 測定時のみPRE、またはPOST。他はOFF

LEVEL/PAN switch PAN

METER PRE switch OFF (POST)

ON switch 測定CHのみON、他はOFF

VCA GROUP (1-8) switch OFF

MUTE GROUP (1-8) switch OFF

MUTE SAFE switch OFF

CUE switch 測定CHのみON、他はOFF

Fader MAX

•MASTER

GROUP (1-18)

EQ (HI,HI-MID,LO-MID,LO)

LEVEL control CENTER

FREQ control MIN

Q control CENTER

ON switch OFF

INSERT switch 測定時のみON、他はOFF

GROUP TO ST

ST1/OFF/ST2 switch 測定時のみST1またはST2、他はOFF

PAN control CENTER

CUE switch 測定時のみON、他はOFF

ON switch 測定時のみON、他はOFF

ST switch 測定時のみON、他はOFF

Fader MAX

STEREO

EQ (HI, HI-MID, LO-MID, LO)

LEVEL control	CENTER
FREQ control	MIN
Q control	CENTER
ON switch	OFF
INSERT switch	測定時のみON、他はOFF
CUE switch	測定時のみON、他はOFF
MIX switch	測定時のみON、他はOFF
ON switch	測定時のみON、他はOFF
L Fader	MAX
R Fader	MAX

TALKBACK

ASSIGN switch	測定時のみON、他はOFF
TB OUT switch	測定時のみON、他はOFF
OSC OUT switch	OFF
OSC switch	OFF
OSC FREQ control	MIN
SWEEP switch	OFF
OSC LEVEL control	MAX
+48V switch	OFF
+4dB switch	OFF (-50dB)
TB LEVEL control	MAX
ON/OFF/ON switch	測定時のみON、他はOFF

CUE

SELECT switch	OFF(CUE A)、ON(CUE B) 測定時のみON
ON switch	測定時のみON、他はOFF
LEVEL control	MAX(A、B共)
PHONES LEVEL control	MAX
LAST CUE switch	OFF

Others

VCA MASTER Fader (1-8)	MAX
VCA MUTE (1-8) switch	測定時のみON、他はOFF
MUTE MASTER (1-8) switch	測定時のみON、他はOFF
METER SELECT switch	TB/OSC:OFF、CUE:OFF
PHANTOM MASTER switch	OFF
VCA CONTROL switch (1-4)	OFF
VCA CONTROL switch (5-8)	OFF
MUTE CONTROL switch (1-4)	OFF
MUTE CONTROL switch (5-8)	OFF
FAN LOW/HIGH switch	LOW
CUE OFF/CONNECT switch	OFF

2 利得

1項の状態、各出力端子には(表2-1~表2-8)の範囲内の出力レベルが得られることを確認します。

表2-1 入力端子 [INPUT CH1-36,44,52]

[単位: dBs]

入力レベル	GAIN VR	30dB PAD	INSERT OUT	DIRECT OUT	CUE OUT(L,R)
-70	MAX	OFF	+4±2	+4±2	+14±2 *1
-40	MAX	ON	----	----	+14±2 *1
-20	MIN	OFF	----	----	+14±2 *1

*1 CH CUEスイッチをONすること。

- 各出力のINPUT(CH1-36,44,52)間のレベル差が、2dB以内であることを確認します。
- GROUP OUT(1-18)間、STEREO OUT1、2(L,R)間、およびCUE A、B OUT(L,R)間のレベル差が、2dB以内であることを確認します。

表2-2 入力端子 [INPUT CH1-36,44,52]

[単位: dBs]

入力 レベル	GAIN VR	30dB PAD	GROUP & ST PRE/OFF/POST SW	ST(1,2) LEVEL/PAN SW	GROUP OUT(1-18)	ST(1,2) OUT(L,R)
-30	MIN	OFF	PRE	PAN	+10±2	+7±2
-30	MIN	OFF	POST	PAN	+20±2 *1	+17±2 *1
-30	MIN	OFF	PRE	LEVEL	----	+10±2 *2

*1 GROUP OUT(1-18)のいずれか一つ、および ST(1,2) OUT(L,R)のいずれか一つの出力端子にて測定して下さい。

*2 CHのPANコントロールRを、MAXにして測定して下さい。

・ GROUP OUT(1-18)間、および ST(1,2) OUT(L,R)間のレベル差が、2dB以内であることを確認します。

表2-3 入力端子 [TB IN]

[単位: dBs]

入力端子	入力レベル	GROUP OUT(1-18)	ST(1,2) OUT(L,R)	TB OUT
TB IN	-60	+14±2	+14±2	+4±2

・ 各出力間のレベル差が、2dB以内であることを確認します。

表2-4 出力端子 [CUE A,B]

[単位: dBs]

入力端子	MASTER CUE switch	入力レベル	出力端子	出力レベル
GROUP (1-18) SUB IN	GROUP CUE ON	-6.0	CUE A (L,R)	+14±2 *1
ST1,2 SUB IN*2	ST CUE ON	-6.0	CUE A (L,R)	+14±2 *1
GROUP (1,2) SUB IN	GROUP CUE ON	-6.0	CUE B (L,R)	+14±2 *3

*1 このとき CUE A OUTは、L、R側両方とも出力されること。

また、MASTERモジュールのSTスイッチをONすると、入力端子がGROUP1,3,5,...17のときはCUE A OUTのL側に出力され、入力端子がGROUP2,4,6,...18のときはCUE A OUTのR側にのみ出力されることを確認します。

*2 このときMIXスイッチをONすると、レベルがOFF時を基準として3dB下がることを確認します。またL、R共に同一信号を加えたときは、レベルがOFF時を基準として3dB上がることを確認します。

*3 CUE SELECTスイッチは、ON(select B)にして下さい。

CUE B OUTは、L、R両方とも出力されること。またMASTERモジュールのSTスイッチをONすると、入力端子がGROUP1のときはCUE B OUTのL側に出力され、入力端子がGROUP2のときはCUE B OUTのR側にのみ出力されることを確認します。

・ (L,R)間のレベル差が、2dB以内であることを確認します。

表2-5 出力端子 [ST1,2 (GROUP to ST)]

[単位: dBs]

入力端子	入力レベル	出力端子	出力レベル
GROUP (1-18) SUB IN	-6.0	ST1,2 (L,R)	+14±2

・ GROUP to STスイッチをST1およびST2に切り換えて測定して下さい。

・ PANコントロールを時計、および反時計方向に回しきったとき、RおよびL側の出力レベルが3dB上がり、他方の出力レベルは-50dBs以下になることを確認します。

表2-6 入力端子 [INSERT]

[単位: dBs]

入力端子	入力レベル	GROUP OUT(1-18)	ST(1,2) OUT(L,R)
CH(1-36,44,52)	-6	+20±2 *1	----
GROUP (1-18)	+4	+14±2	----
ST(1,2) (L,R)	+4	----	+14±2

*1 GROUP(1-18)のいずれか一つの出力端子で測定して下さい。

・ 各出力のINPUT(CH1-36,44,52)間のレベル差が、2dB 以内であることを確認します。

・ GROUP(1-18)間、ST(1,2) (L,R)間のレベル差が、2dB 以内であることを確認します。

表2-7 入力端子 [SUB IN]

[単位: dBs]

入力端子	入力レベル	GROUP OUT(1-18)	ST(1,2) OUT(L,R)	CUE A OUT(L,R)
GROUP (1-18)	+4	+14±2	----	----
ST(1,2) (L,R)	+4	----	+14±2	----
CUE (L,R)	+4	----	----	+14±2

・ 各INSERT OUTには、+4±2dBsの出力レベルが、得られることを確認します。

- GROUP(1-18)間、ST(1,2) (L,R)間、CUE A OUT(L,R)間のレベル差が、2dB以内であることを確認します。

表2-8

CUE A OUT (L,R)	PHONES 1,2(L,R)
+4dBs	0 ± 2dBs

- CUE A OUT(L,R)に指定の出力レベルを得たときのPHONESの出力レベルは上表の通りです。また、L、R 間レベル差が2dB以内であることを確認します。

3 周波数特性

1項の状態、加える信号の周波数を20Hz/20kHzとしたとき、各出力端子の出力レベルが、1kHzの出力レベルを基準として0 ± dBの範囲内にあることを確認します。

ただし、PHONESの20Hzの出力レベルは、-2 ± 2dBの範囲内にあること。

4 EQ化特性

1項の状態、IN、MASTER、STEREOの各モジュールのLO、LO-MID、HI-MID、HIをそれぞれ動かしたときに得られる各周波数における出力レベルは、センタークリック位置の出力レベルを基準として（表4-1～4-4）の範囲内にあることを確認します。

なお、MASTER、STEREOモジュール内にはSHELFスイッチがないため、SHELFスイッチがOFF状態の出力レベルとします。

指定周波数で出力レベルが下表の範囲内に入らない場合は、周波数を変化させて下表の出力レベルが得られることを確認して下さい。このとき、周波数変化は指定周波数の±20%の範囲内とします。

- INPUTモジュールのEQ測定は、GROUP OUT(1)出力にて行って下さい。
- MASTERモジュールのEQ測定は、各GROUP OUT出力にて行って下さい。
- STEREOモジュールのEQ測定は、各STEREO OUT出力にて行って下さい。

表4-1 [HI]

[単位: dB]

GAIN	FREQ	Q	SHELF	1KHz	5KHz	20KHz
MIN	MIN	MIN	OFF	-15 ± 2	----	----
MAX	MAX	MIN	OFF	----	+1 ± 2	+15 ± 2
MAX	MAX	MIN	ON	----	----	+12 ± 2
MAX	MAX	MAX	OFF	----	+10 ± 2	+15 ± 2

表4-2 [HI-MID]

[単位: dB]

GAIN	FREQ	Q	400Hz	2KHz	8KHz
MIN	MIN	MIN	-15 ± 2	----	----
MAX	MAX	MIN	----	+1 ± 2	+15 ± 2
MAX	MAX	MAX	----	+10 ± 2	+15 ± 2

表4-3 [LO-MID]

[単位: dB]

GAIN	FREQ	Q	80Hz	400Hz	1.6KHz
MIN	MIN	MIN	-15 ± 2	----	----
MAX	MAX	MIN	----	+1 ± 2	+15 ± 2
MAX	MAX	MAX	----	+10 ± 2	+15 ± 2

表4-4 [LO]

[単位: dB]

GAIN	FREQ	Q	SHELF	30Hz	160Hz	600Hz
MIN	MIN	MIN	OFF	-15 ± 2	----	----
MAX	MAX	MIN	OFF	----	+1 ± 2	+15 ± 2
MAX	MAX	MIN	ON	----	----	12 ± 2
MAX	MAX	MAX	OFF	----	+10 ± 2	+15 ± 2

5 HPF変化特性

1項状態で、INPUTモジュールのHPFスイッチをONし、HPF fコントロールを動かしたときに、GROUP OUT(1)の出力レベルがスイッチOFFときのレベルを基準として（表5）の範囲内にあることを確認します。

表5

HPF FREQ	20Hz	400Hz
MIN	-3 ± 2	----
MAX	----	-3 ± 2

6 セパレーション

1項の状態でINPUTモジュールのGROUP OUT(1)の出力レベルを+20dBsとしたとき、GROUP OUT(2-18)への漏れレベルが-50dBs以下であることを確認します。また、各GROUP OUTに対する他のGROUP OUTへの漏れ、更にSTEREO(1,2) OUT(L,R)間の漏れについても同様に検査して下さい。

7 VCA絞り切り

1項の状態で、INPUT CH1-36、44、52の各モジュールの入力レベルを-50dBsにセットしFADERの位置をMINに合わせたとき、各GROUP OUT(1)の出力レベルが-60dBs以下であることを確認します。

8 LED METER点灯レベル

1項の状態で、MT PREスイッチをONし、各INPUTモジュールの入力に信号を加えたとき、各LEDが点灯するときのINSERT OUTの出力レベルが（表8）の範囲内にあることを確認します。

表8

[単位：dBs]

INSERT OUT	-20	-10	-6	0	6	PEAK
出力レベル	-16 ± 2	-6 ± 2	-2 ± 2	$+4 \pm 2$	$+10 \pm 2$	$+23.5 \pm 2$

9 PEAK (HA) 点灯レベル

1項の状態で、各INPUTモジュールの入力に信号を加えたとき、LEDが点灯するときのINSERT OUTの出力レベルが $+23.5 \pm 2$ dBsの範囲内にあることを確認します。

またEQスイッチをONしHI LEVELコントロールをMINにしたときは、それより 15 ± 4 dB低い値で点灯することを確認します。

さらに、HI LEVELコントロールをセンターで出力レベルが15dBs のときには消灯していて、HI LEVELコントロールをMAXにしたときは点灯することを確認します。

10 歪率

1項の状態でGAINコントロールをMINにし、INPUT(CH1)およびMASTERの各VR、FADERをNominal位置とし、GROUP OUT(1-18)、ST(1,2) OUT(L,R)、CUE(A,B) OUT(L,R)、TB OUTの各出力端子に+14dBsの出力が得られたときの歪率が、0.01%以下であることを確認します。

ただし、TB OUT端子で歪率を測定するときは、+4スイッチをONして下さい。

次にCUE SUB IN(L)端子から信号を加え、PHONES(1,2) L端子に0dBsの出力が得られたときの歪率が、0.7%以下であることを確認します。また、PHONES(1, 2) R端子での歪率についても同様に検査します。このとき、信号はCUE SUB IN(R)端子から加えます。

11 最大出力

1項の状態で、GROUP OUT(1-18)、ST(1,2) OUT(L,R)、CUE(A,B) OUT(L,R)、TB OUTの各出力端子に+24dBs、歪率1%以下の出力が得られることを確認します。

また、PHONES(L,R)、(1,2)端子に3dBsの出力が得られたときの歪率が、1%以下であることを確認します。ただし、PHONESの測定は、出力端子L、R独立で行って下さい。

12 VU METER

1項の状態、GROUP OUT(1-18)、ST(1,2) OUT(L,R)の各出力レベルを+4dBsとしたとき、各VUメーターの指示が 0 ± 0.1 VU以内であることを確認します。

また、METER SELECTスイッチを切り替えた場合、各VUメーターの指示が 0 ± 0.1 VU以内であることを確認します。

<36ch METER SELECT>

TB/OSCスイッチをONすると、GROUP15~18がST1L~ST2Rに切り替わることを確認します。そのとき、メーターパネルのST LEDも点灯することを確認します。

さらにTB/OSCをONしたままで、TB OUTスイッチとTB ONスイッチを同時にONするか、またはOSC OUTスイッチとOSC ONスイッチを同時にONした場合には、GROUP11がTBに切り替わり、GROUP12がOSCに切り替わることを確認します。そのとき、メーターパネルのTB/OSC LEDも点灯することを確認します。

CUEスイッチをONすると、GROUP13がCUE Lに切り替わり、GROUP14がCUE Rに切り替わることを確認します。

<44、52ch METER SELECT>

TB/OSCスイッチをONすると、GROUP11がTBに切り替わり、GROUP12がOSCに切り替わることを確認します。

またCUEスイッチをONすると、GROUP13がCUE Lに切り替わり、GROUP14がCUE Rに切り替わることを確認します。

- ・ VU METER の指示が範囲内にない場合、MT シート内の半固定 VR によってVU METER の指示が 0 ± 0.1 VU 以内となるように調整すること。

また、PEAK LED (赤) は、出力レベル $+23.5 \pm 2$ dBs の範囲内で点灯すること。

13 ノイズレベル

1項の状態、INPUTモジュールの入力端子を 150Ω の抵抗で短絡したとき、GROUP OUT(1)で得られるノイズレベルが-28dBs以下であることを確認します。

- ・ ノイズレベルが-28dBs以上の場合は入力換算でのノイズレベルを求め、それが-128dBs以下であれば可とします。

TB INの入力端子を 150Ω の抵抗で短絡したとき、GROUP OUT(1)で得られるのイズレベルが-64dBs以下であることを確認します。

- ・ ノイズレベルが-64dBs以上の場合は入力換算でのノイズレベルを求め、それが-128dBs以下であれば可とします。

14 残留ノイズ

1項の状態、全てのINPUTモジュールのFADER、GROUP VRをMIN、ASSIGNスイッチをOFFします。MASTERモジュールの各出力のONスイッチをONします。このとき、MASTER FADERを最大または最小にしたときのノイズレベルが(表14)のレベル以下のことを確認します。

表14 残留ノイズレベル

[単位: dBs]

GROUP & STEREO FADER CUE VOLUME	GROUP OUT(1-18)	ST(1,2) OUT(L,R)	CUE(A,B) OUT(L,R)	TB OUT	OSC OUT	PHONES (L,R)
MAX (最大)	-71	-70	-73	---	---	---
MIN (最小)	-100	-100	-100	-93	-93	-82

15 位相

1項の状態、各入力端子に加えられた信号と各出力端子で得られる信号が同相であることを確認します。またINのφスイッチをONしたときは逆相になることを確認します。

- ・ バランス型入出力端子のピン配置

キャノン端子		フォーン端子	
pin 1	GND	T	+(HOT)
pin 2	+(HOT)	R	-(COLD)
pin 3	-(COLD)	S	GND

16 発振器

1項の状態、TB OUTスイッチ、OSC OUTスイッチおよび"10KHz"スイッチをONしたとき、TB OUTおよびOSC OUT端子には出力レベル $+14 \pm 2$ dBsの信号が得られることを確認します。("1KHz"、"100Hz"、"PINK"も同様)

このとき"10KHz"、"1KHz"、"100Hz"の歪率が1%以下であることを確認します。

またSWEEPスイッチON、OSC FREQコントロールを変化させたとき、TB OUTおよびOSC OUTの出力レベルと周波数が(表16)の範囲内にあることを確認します。

表16

OSC SW	OSC FREQ volume: MIN		OSC FREQ volume: MAX		SWEEP switch: OFF
	レベル(dB)	周波数(Hz)	レベル(dB)	周波数(Hz)	
10KHz	$+14 \pm 2$	$2\text{KHz} \pm 20\%$	$+14 \pm 2$	$20\text{KHz} \pm 20\%$	$10\text{KHz} \pm 20\%$
1KHz	$+14 \pm 2$	$200\text{Hz} \pm 20\%$	$+14 \pm 2$	$2\text{KHz} \pm 20\%$	$1\text{KHz} \pm 20\%$
100Hz	$+14 \pm 2$	$20\text{Hz} \pm 20\%$	$+14 \pm 2$	$200\text{Hz} \pm 20\%$	$100\text{Hz} \pm 20\%$

・OSCスイッチを"OFF"にしない限り、OSC ON LEDが点灯していることを確認します。

17 CUE

・INPUT CUE PRIORITY

INPUTモジュールのCUEスイッチのいずれか一つでもONしたときは、"INPUT CUE" LEDが点灯することを確認します。

また、CUE OFF/CONNECTスイッチをCONNECT側にし、リアパネルのEXT CONTROLコネクタの22ピン端子をGNDと短絡したときも同様の結果が得られ、OFF側にしたときは"INPUT CUE" LEDが消灯することを確認します。

このとき、MASTERおよびSTEREOモジュールのCUEスイッチからの信号が遮断されることを確認します。

・CUE LOGIC CONTROL (MASTER CUE のみ)

* CUE MIXモード

1項の状態、MASTERおよびSTモジュールのCUEスイッチをONしたとき、ONされたCUEスイッチのLEDが全て点灯し、各GROUP、STEREOの信号がMIXされてCUE OUTに出力されることを確認します。

* LAST CUE モード

LAST CUEスイッチを押し、任意のMASTERおよびSTモジュールのCUEスイッチをONにしたとき、最後に押されたCUEスイッチのLEDのみが点灯し、他のLEDが消灯することを確認します。

また、そのGROUPまたはSTEREOの信号のみがCUE OUTに出力されることを確認します。ただし、CUE STスイッチが押されたMASTERモジュールのCUEは同一モジュール内においてCUE MIXモードとなり、ODDはLチャンネルに出力され、EVENはRチャンネルに出力されることを確認します。

再度LAST CUEスイッチを押したときは、CUEスイッチのLEDが消灯し、CUE OUTの信号が遮断されることを確認します。

* CUE RESET

LAST CUEスイッチをON/OFFするごとに、MASTERおよびSTEREOモジュールのCUEスイッチのLEDが全て消灯し、CUE OUTの信号が遮断されることを確認します。またLAST CUEモードのとき、CUE STスイッチをOFFした場合もCUE RESETが働くことを確認します。

18 VCA CONTROL

1項の状態、各INPUTモジュールのVCA GROUPスイッチ1~8のうち一つだけONしたとき、GROUP OUT(1)端子の出力レベルが、VCA GROUPスイッチがOFFのときの出力レベルを基準として、それぞれ $+10 \pm 2$ dBの範囲内にあることを確認します。そのとき、ONしたVCA GROUPスイッチと同番号のVCA MUTEスイッチをONした場合、GROUP OUT(1)端子の出力レベルが、VCA MUTEスイッチがOFFのときの出力レベルを基準として、それぞれ -80dB 以下であることを確認します。

またVCA MASTER FADER1~8を全てMINとし、各INPUTのVCA GROUPスイッチ1~8を一つだけONしたとき、GROUP OUT(1)端子で得られる出力レベルが、スイッチがOFFのときの出力レベルを基準として、それぞれ -80dB 以下であることを確認します。

また"NOMINAL"のLEDが、パネル目盛の $0 \pm 1\text{dB}$ の範囲内で点灯することを確認します。

19 MUTE CONTROL

全てのINPUTモジュールのONスイッチをONします。

MUTE MASTERスイッチ(1-8)とINPUTモジュールのMUTEスイッチ(1-8)において、同番号のスイッチを共にONしたときに、そのモジュールの"ON"のLEDが消灯することを確認します。このとき"ON"のLEDが消灯したモジュールからの信号は遮断されることを確認します。

また、この状態でMUTE SAFEスイッチをONすると、MUTEが解除されることを確認します。

20 EXTERNAL VCA CONTROL

VCA CONTROLスイッチ(1-4)と(5-8)をMASTER側にセットし、各VCA MASTER FADER(1-8)を変化させたとき、リアパネルのEXTERNAL CONTROLのVCA BUSSの各端子には(表20)の範囲内の電圧が得られることを確認します。

またSLAVE側にセットしたときは、得られる電圧はVCA MASTER FADERに無関係に $0 \pm 0.5V$ の範囲内であることを確認します。また、OFFにセットしたときは、開放となります。

表20

VCA MASTER FADER	電圧
MAX	$+0.5 \pm 0.05V$
MIN	-9V 以下

21 EXTERNAL MUTE CONTROL

INPUTモジュール(1-8)のONスイッチをONし、チャンネル番号と同じ番号のMUTEスイッチをONします。そして、MUTE CONTROLスイッチ(1-4)と(5-8)をSLAVE側にセットします。

リアパネルのMUTE CONTROLコネクタの各MUTE(1-8)バスをGNDと短絡したとき、対応するモジュールがMUTEされることを確認します。

また、MUTE CONTROLスイッチ(1-4)と(5-8)がSLAVE側にセットされているときは、MUTE MASTERスイッチをONしてもINPUTモジュールがMUTEされないことを確認します。

22 PHANTOM (+48V)

各INPUTおよびTBモジュールの入力コネクタのピン①-②間に負荷抵抗 $10k\Omega$ (1W以上)を接続し、ピン②-③間を短絡します。

PHANTOM MASTERスイッチをONし、各INPUTおよびTBモジュールの+48VスイッチをONしたとき、負荷抵抗両端に $+35 \pm 3V$ の電圧が得られることを確認します。

23 ランプ出力 (36CH - 4ヶ所、44CH - 5ヶ所、52CH - 5ヶ所)

ランプ出力コネクタのピン③-④間に負荷抵抗 $3K\Omega$ (5W以上)を接続し、LAMP DIMMERコントロールを変化させたとき、抵抗の両端の電圧が(表23)の範囲内にあることを確認します。

表23

LAMP DIMMER	電圧
MAX	$+11 \pm 1V$
MIN	$+2 \pm 1V$

24 ファンスイッチ

FANスイッチをHIGH/LOWに切り換えたとき、FANの回転がHIGH/LOWに切り替わることを確認します。

25 パワーインジケータ点灯確認

1項の状態では+12V、+19V、-19V、+48VのLEDが緑色で点灯すること。

このとき、PHANTOM MASTERスイッチをONしたときに+48VのLEDがオレンジ色に変わることを確認します。

また、電源ON時には、PW CAUTIONのLEDが一瞬赤色で点灯し、すぐに消灯することを確認して下さい。

26 電源電圧変動

電源電圧を、規定の $\pm 10\%$ の範囲で変化させても動作に以上のないことを確認します。

27 測定器

- ・発振器はバランス出力型で、出力インピーダンスは 10Ω 以下のこと。
- ・オシロスコープ・レベル計などの入力インピーダンスは、 $100k\Omega$ 以上のこと。
- ・ノイズレベルは、12.7kHz、-6dB/OCTのLOW PASS FILTERを用いて測定すること。
- ・測定器は、バランス入力型を用いること。

PM4000Mの調整

1 INPUTモジュール

1-1 準備

- PM4000M本体と電源 (PW4000) を付属の接続ケーブルで接続します。
- 指定のない場合、加える信号は1kHz、-70dBsの正弦波とします。
- ※本検査にて取り扱う信号のレベルは、0dBs=0.775Vです。
- 特に指定のない場合、ツマミ類は以下のように設定して下さい。

+48V switch	OFF
GAIN trim	MIN
PAD (30dB) switch	OFF
ϕ switch	OFF (正相)
EQ (HI, HI-MID, LO-MID, LO)	
LEVEL control	CENTER
FREQ control	MIN
Q control	CENTER
ON switch	OFF
(HI, LO)	
SHELF switch	OFF (PEAK)
HPF FREQ control	MIN
HPF switch	OFF
INSERT ON switch	OFF
INSERT PRE switch	OFF (POST)
GROUP 1~18	
LEVEL control	MAX
PRE/OFF/POST switch	OFF
ST 1,2	
LEVEL(LEVEL L) control	MAX
PRE/OFF/POST switch	OFF
PAN(LEVEL R) control	CENTER
LEVEL/PAN switch	PAN
METER PRE switch	ON (PRE)
ON switch	ON
VCA GROUP (1-8) switch	OFF
MUTE GROUP (1-8) switch	OFF
MUTE SAFE switch	OFF
CUE switch	ON
Fader	MAX
Internal switch	▼印

- 特に指定のない場合、検査用スイッチは以下のように設定して下さい。

[S1]~[S10]	OFF
[S11]	OFF(+0.5)

1-2 STEP 1: VCA基準電圧調整

1-1項の状態、テストポイントTP102に $-0.5 \pm 0.01V$ の電圧が得られるように半固定抵抗で調整します。TP102のかわりに、下表の各ポイントで測定しても可です。

表1-2

測定端子	電圧値	調整用半固定抵抗
IN3シートTP102	$-0.5 \pm 0.01V$	VR126 (IN3シート)

1-3 STEP 2: OFFSET調整

無信号入力として調整を行います。

フェーダーを" ∞ "の位置とし、テストポイントTP101で表1-3に示した範囲の電圧が得られるように半固定抵抗で調整して下さい。

表1-3

測定端子	電圧値	調整用半固定抵抗
TP101	$0V \pm 5mV$	VR132 [$-\infty$ ADJ] (IN1シート)

1-4 STEP 3: OFFSET A調整 (GAIN 0dBのとき)

フェーダーを"0"の位置とし、テストポイントTP101で表1-4に示した範囲の電圧が得られるように半固定抵抗で調整して下さい。

表1-4

測定端子	電圧値	調整用半固定抵抗
TP101	0V $\pm$ 10mV	VR128 [OFFSET A] (IN1シート)

1-5 STEP 4: OFFSET B調整 (GAIN +20dBのとき)

フェーダーを"10"の位置とし、外部より0.5V $\pm$ 10mVの直流電圧をVCA CONTROL 1端子に加え、VCA GROUP ASSIGN 1スイッチをONします。そして、テストポイントTP101で表1-5に示した範囲の電圧が得られるように半固定抵抗で調整して下さい。

表1-5

測定端子	電圧値	調整用半固定抵抗
TP101	0V $\pm$ 10mV	VR131 [OFFSET B] (IN1シート)

OFFSET Aの調整値とOFFSET Bの調整値の両方を満足するまで、両方の調整を繰り返し行って下さい。

なお、調整の際に加える0.5V $\pm$ 10mVの直流電圧は、VCA MASTER電圧調整が完了しているMASTERモジュールのVCAコントロールバスを經由して、以下に示す操作により供給を受けることができます。

- ・ INPUTモジュールのVCA GROUP ASSIGNスイッチのいずれか一つを押し、INPUTフェーダーをMAXとします。そして、押されたVCA MASTERのフェーダーをMAXにします。

1-6 STEP 5: GAIN 0dBのときの歪率調整

GAINコントロールをMINにセットし、チャンネルONスイッチをON、GROUP1 LEVELコントロールMAX、GROUP1 PRE/OFF/POSTスイッチをPOST側にセットします。そして、テストポイントTP103で得られる出力レベルが+20dBとなるように入力信号のレベルを調整します。

フェーダーを"0"の位置とし、各出力で得られる出力信号の歪率が最良値となるように半固定抵抗で調整して下さい。

表1-6

測定端子	歪率	調整用半固定抵抗
TP101	最良値	VR129 [THD 0] (IN1シート)

1-7 STEP 6: GAIN +20dBのときの歪率調整

1-6項の状態、テストポイントTP101で得られる出力レベルが+20dBとなるように入力信号のレベルを調整します。

フェーダーを"10"の位置とし、外部より0.5V $\pm$ 10mVの潮流電圧をVCA 1端子に加えてVCA GROUP ASSIGN 1スイッチをONします。このとき、テストポイントTP103で得られる出力信号の歪率が最良値となるように半固定抵抗で調整して下さい。

表1-7

測定端子	歪率	調整用半固定抵抗
TP101	最良値	VR130 [THD 20dB] (IN1シート)

GAIN 0dBのときの歪率とGAIN 20dBのときの歪率が、共に0.01%以下になるまで両方の調整を繰り返して行って下さい。

なお、調整の際に加える0.5V $\pm$ 10mVの直流電圧は、VCA MASTER電圧調整が完了しているMASTERモジュールのVCAコントロールバスを經由して、以下に示す操作により供給を受けることができます。

- ・ INPUTモジュールのVCA GROUP ASSIGNスイッチのいずれか一つを押し、INPUTフェーダーをMAXとします。そして、押されたVCA MASTERのフェーダーをMAXにします。

1-8 STEP 7: VCA絞り切り調整

GAINコントロールをMINとし、加える入力信号のレベルを0dBs（フェーダーがNOMINAL時、TP103に+20dBが得られるレベル）にセットし、フェーダーを" ∞ "の位置に合わせます。
このとき、テストポイントTP103にて得られる出力信号の波形の振幅が最小となるように半固定抵抗で調整して下さい。

表1-8

測定端子	電圧値	調整用半固定抵抗
TP103	-90dBs (110dB) 以下	VR132 [$-\infty$ ADJ] (IN1シート)

1-9 LED (METER, PEAK) 点灯レベル

1-1項の状態ではMETER PREスイッチをONして信号を加え、INSERT OUTの出力レベルが+4dBsのときに"0"のLEDが点灯するようにIN3シートの半固定抵抗VR125で調整して下さい。
また、入力信号のレベルを1dB下げたとき、"0"のLEDが消灯することを確認して下さい。

表1-9-1

測定端子	調整用半固定抵抗
INSERT OUT	VR125 (IN3シート)

(INSERT OUT端子の負荷抵抗は、10k Ω とします)

さらに、他のLEDも下表の範囲内のレベルで点灯することを確認して下さい。

表1-9-2

INSERT OUT	-20	-10	-6	0	6	HA & EQ PEAK
出力レベル	-16 $\pm$ 2	-6 $\pm$ 2	-2 $\pm$ 2	+4 $\pm$ 2	+10 $\pm$ 2	+23.5 $\pm$ 2

2 MASTERモジュール**2-1 準備**

- PM4000M本体と電源(PW4000)を付属の接続ケーブルで接続します。
- 指定ない場合、加える信号は1kHz、0dBsの正弦波とし、入力端子はBUSS INとします。
- ※本検査にて取り扱う信号のレベルは、0dBs=0.775Vです。
- 特に指定のない場合、ツマミ類は以下のように設定して下さい。

GROUP (*1,*2)

EQ control	全てMIN
EQ switch	OFF
PAN(G to ST) control	CENTER
GROUP TO ST	
ST1/OFF/ST2 switch	測定時のみST1またはST2、他はOFF
INSERT switch	測定時のみON、他はOFF
CUE switch	測定時のみON、他はOFF
ON switch	測定時のみON、他はOFF
Fader	MAX

CUE

ST switch	OFF
-----------------	-----

VCA MASTER (MAS1のみ)

Fader	MAX
VCA MUTE switch	測定時のみON、他はOFF

MUTE MASTER (MAS2のみ)

MUTE switch	測定時のみON、他はOFF
-------------------	---------------

[S1]-[S3]	OFF
INTERNAL SW	目印側

2-2 VCA CONTROL

2-1項の状態、VCA MASTER FADERをMAXにしたとき、TP301(VCA CONTROL MASTER)の電圧が $+0.5 \pm 0.01V$ になるようにMAS2シートのVR301を調整します。また、MINにしたときは、TP301の電圧が $-9V$ 以下の電圧が得られることを確認して下さい。

"NOMINAL" LEDが、TP301(VCA CONTROL MASTER)の電圧が $0 \pm 60mV$ の範囲内で点灯することを確認します。また、VCA MUTEスイッチをONしたとき、TP301で得られる電圧が $-9V$ 以下であることを確認します。

3 TALKBACKモジュール

3-1 準備

- ・ PM4000M本体と電源 (PW4000) を付属の接続ケーブルで接続します。
- ・ 指定のない場合、加える信号は、INPUT(TB)には1kHz、 $-50dBs$ の正弦波、INPUT(CUE SUB)には1kHz、 $0dBs$ の正弦波とします。

※ 本検査にて取り扱う信号のレベルは、 $0dBs=0.775V$ です。

- ・ 特に指定のない場合、ツマミ類は以下のように設定して下さい。

TALKBACK

ASSIGN switch.....	測定時のみON、他はOFF
TB OUT switch.....	ON
OSC OUT switch.....	ON
OSC switch.....	OFF
OSC FREQ control.....	MIN
SWEEP switch.....	OFF
OSC level control.....	MAX
+48V switch.....	OFF
+4dB switch.....	OFF ($-50dB$)
TB level control.....	MAX
ON/OFF/ON switch.....	測定時のみON、他はOFF

CUE

LAST CUE switch.....	OFF
A/B switch.....	OFF
ON switch.....	測定時のみON、他はOFF
CUE level control (A,B).....	MAX
PHONES Level control.....	MAX

METER SELECT SW OFF

3-2 発振器

3-1項の状態、TB ASSIGNスイッチ(GROUP 1)および"1kHz"スイッチをONしたとき、GROUP 1端子の出力信号レベルの歪率が1%以下で最小になるようにVR203 (THD ADJ) を調整して下さい。

次に出力レベルが、 $10 \pm 0.5dBs$ になるようにVR204 (SINE LEVEL) を調整します。

この状態で、"PINK"スイッチをONしたときの出力レベルも $10 \pm 0.5dBs$ になるように、VR201 (PINK LEVEL) を調整して下さい。

4 測定器

- ・ 発振器の出力インピーダンスは、 10Ω 以下のこと。
- ・ オシロスコープ、レベル計などの入力インピーダンスは、 $100k\Omega$ 以上のこと。
- ・ ノイズレベルは、 $12.7kHz$ 、 $-6dB/OCT$ のLOW PASS FILTERを用いて測定すること。

■ PW4000の検査と調整

1. LINE VOLTAGE表示の調整

電源スイッチOFFの状態で、リアパネルのLINE VOLTAGE INDICATORスイッチをONしたとき、LINE VOLTAGEの表示のみが動作していることを確認します。

フロントパネル左下の調整穴よりドライバーを挿入し、LINE VOLTAGEの表示が一次電源電圧値 $\pm 1V$ の範囲になるようにMONシートの半固定抵抗VR501を調整します。

調整が終了したら、LINE VOLTAGE INDICATORスイッチをOFFにしておきます。

また、このとき全ての表示が消灯していることを確認します。

2. 無負荷チェック

テスト用のショートコネクタ(TX800290)をPW4000のDC OUTPUT端子に接続してから、電源スイッチをONします。

以下の項目について確認します。

- 1) LINE VOLTAGEが表示された後、1~3秒後に左右のファンが回転しはじめること。
- 2) 電源スイッチ投入後、 6 ± 2 秒後にOPERATE状態を示す+48、+12、+19、-19のLED(緑)が点灯すること。

3. THERMAL表示とファンの動作チェック

テスト用のショートコネクタ(TX800290)をPW4000のDC OUTPUT端子に接続した状態で、ACシートのCN601からコネクタを抜いたとき、THERMALのLED(赤)が点灯してファンの回転数が上がることを確認します。

次に、CN601にコネクタを接続したときは、THERMALのLED(赤)が消灯してファンの回転数が下がることを確認します。

4. オープン検出回路チェック

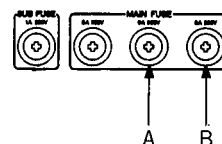
テスト用のショートコネクタ(TX800290)をPW4000のDC OUTPUT端子に接続し、リアパネルにある3本のMAIN FUSEの内の中央のヒューズ(図中のA)を抜いた状態で電源スイッチをONします。

このとき、OPERATE状態を示す+48、+12、+19、-19のLED(緑)が一度点灯した後、1~5秒後に消灯することを確認します。

次に、抜いたヒューズを元に戻し、MAIN FUSEの内の右側のヒューズ(図中のB)を抜いて検査したときも同様の結果が得られることを確認します。

この検査が終了したら、抜いたヒューズを元に戻しておいて下さい。

注意：この検査をPM4000本体を接続した状態で行うと、ヒューズの容量以上の電流がヒューズ流れてヒューズを劣化させる可能性があるため、間違ってPM4000本体を接続した状態で検査を実行した場合は、ヒューズを未使用のものと交換して下さい。



5. 定格電圧時および減電圧時の出力電圧調整

PM4000とPW4000を付属の電源ケーブルで接続した後、一次電源電圧をスライダックを使って定格値に設定します。

次に、DC1シートのVR301(LOW.ADJ)とDC2シートのVR401(LOW.ADJ)とVR403(48V.ADJ)を時計方向に回し切ります。

この状態で、各出力電圧を表1に示す方法で調整します。

注意：(LOW.ADJ)、(LOW.ADJ)、(48V.ADJ)は基板の表面印刷の表示です。

表1

測定点	電圧値	調整用半固定抵抗
+19端子(DC1シート)	+18.1±0.05V	DC1シートのVR302(20V.ADJ)
+12端子(DC2シート)	+12.1±0.05V	DC2シートのVR402(12V.ADJ)
+48端子(DC2シート)	+48±2V	確認のみ

次に、一次電源電圧をスライダックを使って定格値の70%に設定します。

この状態で、各出力電圧を表2に示す方法で調整します。

調整用半固定抵抗を、時計方向回し切った状態から半時計方向へゆっくり回していくと、しばらくの間は同じ電圧値を示しますが、急に電圧が下がっていくので注意しながら半固定抵抗を回して下さい。また、リップル電圧が規定値以下であることも確認して下さい。(調整する前は規定値以上のリップルがでていますが、調整後には規定値以下のリップルとなります。)

なお、この調整に際して、表1に示した調整に使用した半固定抵抗VR302とVR402は動かさないで下さい。これらの半固定抵抗を動かしてしまった場合は、表1の調整をやり直して下さい。

表2

測定点	電圧値	リップル電圧	調整用半固定抵抗
+19端子(DC1シート)	表1での調整結果より0.5V低い値	3mVp-p	DC1シートのVR301(LOW.ADJ)
-19端子(DC1シート)	電圧値の確認は不要	3mVp-p	リップルの確認のみ
+12端子(DC2シート)	表1での調整結果より0.3V低い値	3mVp-p	DC2シートのVR401(LOW.ADJ)
+48端子(DC2シート)	表1での調整結果より2.0V低い値	3mVp-p	DC2シートのVR403(48V.ADJ)

最後に、一次電源電圧を定格値に戻したとき、各端子で得られる電圧が表3に示した値の範囲内にあり、リップルが3mVp-p以下であることを確認します。

表3

測定点	電圧値	リップル電圧
+19端子(DC1シート)	+18.0±0.3V	3mVp-p以下
-19端子(DC1シート)	-18.0±0.3V	3mVp-p以下
+12端子(DC2シート)	+12.0±0.3V	3mVp-p以下
+48端子(DC2シート)	+48±2V	3mVp-p以下

6. CAUTION LEDの点灯チェック

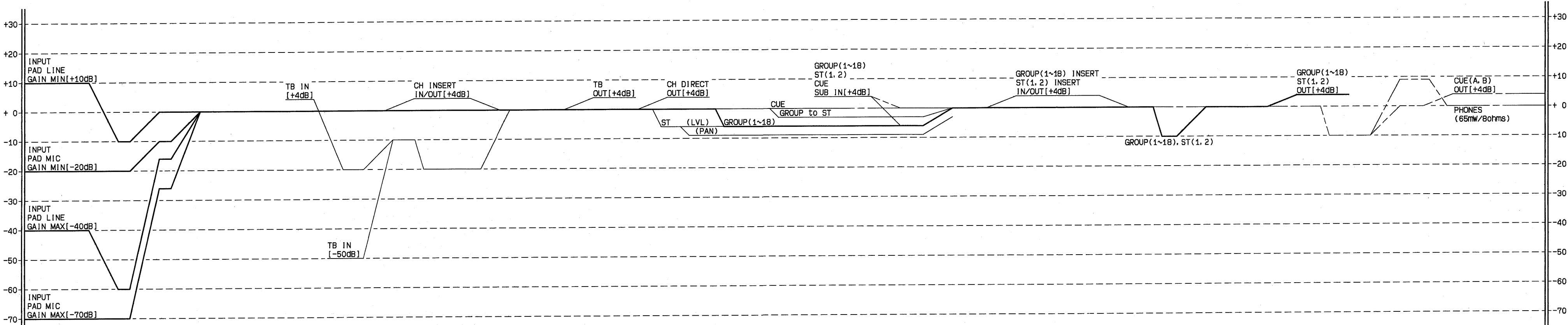
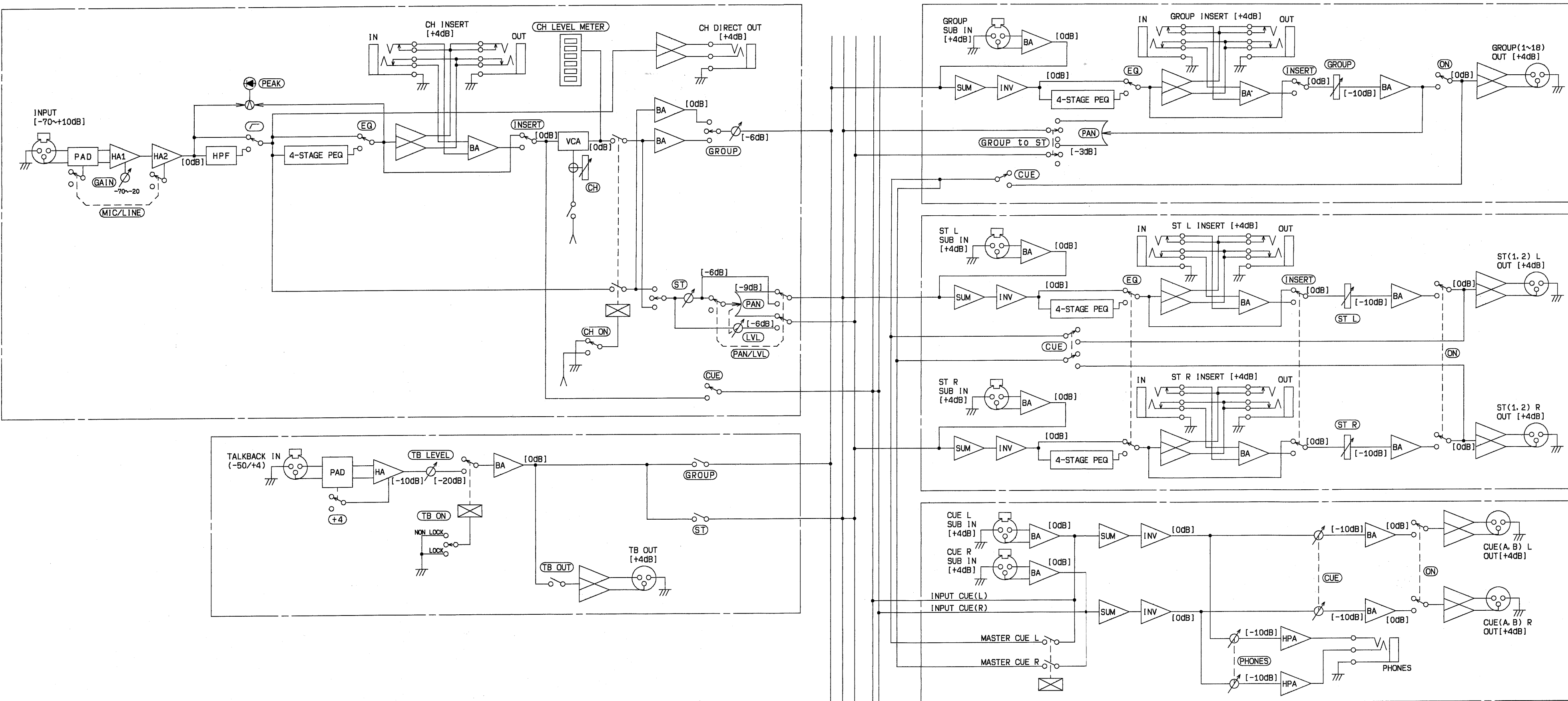
PM4000とPW4000を付属の電源ケーブルで接続した状態で、ACシートのCN104からコネクタを抜いたとき、PM4000のPW CAUTION LED(赤)が点灯することを確認します。PW CAUTION LED(赤)が点灯してから2±2秒後に、PW4000のOPERATE状態を示す+14、+12、+19、-19のLED(緑)が消灯し、CAUTION状態を示すLED(赤)が点灯することを確認します。

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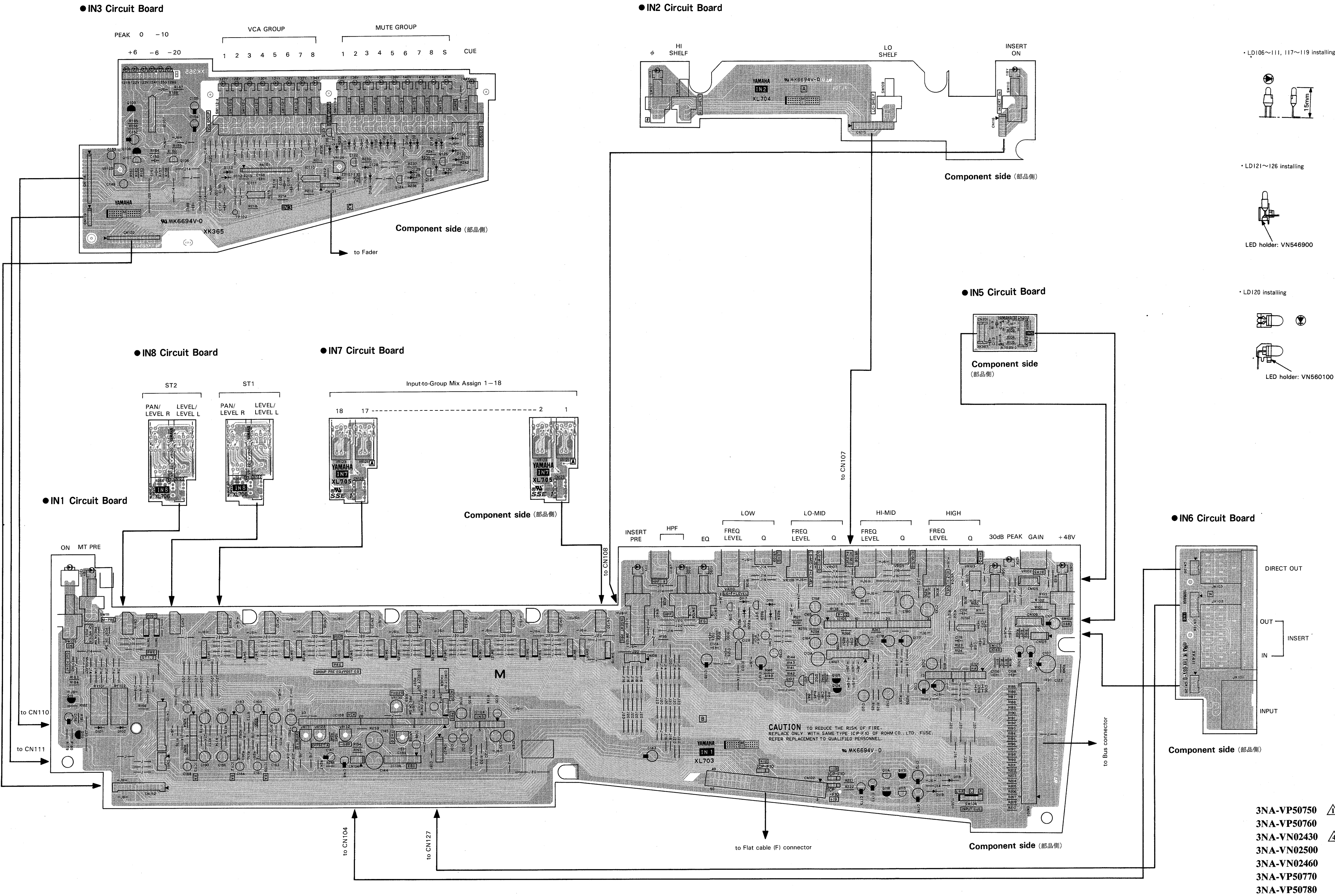
PM4000M BLOCK & LEVEL DIAGRAM

PM4000M/PW4000



KEC-91975

MONITOR INPUT MODULE (IN1, IN2, IN3, IN5, IN6, IN7, IN8)



Notes)

Circuit Board:	IN1 (VP507500) XL703B0	
1. Circuit Board:	IN5 (VN024500)	
2. IC		
IC101:	917090 (XK866A00) HA	
IC102, IC103:	NE5532P (IG102500) OP AMP	
IC104:	911306 (XK872B00) INS	
IC105:	911308 (XK867B00) PEQ	
IC106:	917040 (XK871A00) EBO	
IC108:	917089 (XK868C00) VCA	
IC109, C112, C113:	917037 (XK873B00) BA	
3. Transistor		
Q101, Q102, Q103,		
Q114, Q117, Q118:	2SC1815 Y, GR (IC1815M0)	
Q104, Q105, Q110,		
Q111, Q116, Q113:	2SB647 C, D (IB064730)	
Q115:	2SD667 C, D (ID066700)	
4. Diode		
D101, D102, D114,		
D115, D116, D117:	1SS133, 1SS176 (VB941200)	
D118, D119:	1SR35-100A (VE170000)	
5. LED		
LD106, LD107:	GL2PR6 RE (VH325200) +48V, PEAK	
LD108, LD111, LD119:	GL2HY6 YE (VJ471200) 30dB, INSERT PRE, MT PRE	
LD109, LD110:	GL2EG6 GR (VH325300) EQ, HPF	
LD120:	GL5HY40 YE (VP155700) ON	
6. Mylar Cap.		
C104, C105:	470P 50V J (UA352470)	
C106, C108, C112:	SL 100P 50V J (FG652100)	
C116, C117:	F 0.0100 50V Z (FG644100)	
C118, C125:	SL 47P 50V J (FG651470)	
C119:	SL 68P 50V J (FG651680)	
C122, C181, C182:	BP 1000P 50V K (FG613100)	
C123, C124:	0.1200 50V J (UA355120)	
C141:	0.0470 50V J (UA354470)	
C191:	3300P 50V J (UA353330)	
7. Electrolytic Cap.		
C101:	47.00 50.0V (UJ867470)	
C102, C103:	10.00 50.0V (VJ097400)	
C107:	1000 6.3V (UJ819100)	
C109, C115, C120,		
C121, C128, C129,		
C130, C136, C137,		
C138, C157, C158,		
C159, C162, C163,		
C164, C165, C185,		
C186, C189, C190:	BP-VP 47.00 25.0V (VN321100)	
C110, C111, C126,		
C127, C172, C131,		
C132, C135, C146,		
C160, C161, C179,		
C183, C184, C187,		
C188:		
C133, C134, C180:	BP 10.00 25.0V (UK547100)	
C139, C140:	BP-VP 100.00 25.0V (VN452100)	
C143:	BP 4.7 25.0V (UK846470)	
C144, C145:	100.00 16.0V (UJ838100)	
C147, C148, C173,	BP-VP 220.00 25.0V (VL049300)	
C175:		
C174, C177, C178:	10.00 25.0V (UJ847100)	
C176:	100.00 25.0V (UJ848100)	
	10.00 16.0V (UJ837100)	
8. Carbon Resistor		
R103, R115, R125,		
R126, R127, R131,		
R132, R133, R134,		
R135, R140, R141,		
R143, R145, R150,		
R151, R152, R153,		
R154, R155, R156,		
R169, R170, R171,		
R172, R173, R174,		
R175, R176, R177,		
R178, R251, R252,		
R253, R254, R255:	100.0K 1/4 J (HF758100)	
R108, R109:	10.0 1/4 J (HF754100)	
R110, R114:	470.0 1/4 J (HF75547)	
R117, R147, R221,		
R222:	1.0K 1/4 J (HF756100)	
R120:	2.2M 1/4 J (HF75922)	
R121, R124, R130:	39.0 1/4 J (HF75439)	
R146, R179, R180:	4.7K 1/4 J (HF756470)	
R148:	20.0K 1/4 J (HF75720)	
R149:	30.0K 1/4 J (HF75730)	
R142, R144:	47.0K 1/4 J (HF757470)	
R181:	10.0K 1/4 J (HF757100)	
R182:	22.0K 1/4 J (HF757220)	
R183, R184:	2.2K 1/4 J (HF756220)	
R223, R225:	12.0K 1/4 J (HF75712)	
R224, R226:	100.0 1/4 J (HF755100)	
9. Flame Proof C. Resistor		
R247, R248, R256,		
R257:	10.0 1/4 J (HV754100)	
R249:	390.0 1/4 J (HV755390)	
10. Metal Film Resistor		
R101, R102:	6.8K 1/4 F (VB067300)	
R107, R129:	4.7K 1/4 F (VA074100)	
R111, R113:	2.2K 1/4 F (VB066300)	
R112:	27.0 1/4 F (VB061100)	
R116:	910.0 1/4 F (VB065000)	
R122, R123, R245,		
R246:	10.0K 1/4 F (VA074400)	
R128, R136:	2.4K 1/4 F (VB066400)	
R137, R138, R139:	3.0K 1/4 F (VB066600)	
R185, R186, R187,		
R188, R189, R190,		
R191, R192, R193,		
R194, R195, R196,		
R197, R198, R199,		
R201, R202, R203,		
R204, R205, R206,		
R207, R209, R210:	18.0K 1/4 F (VB067900)	
R250:	15.0K 1/4 F (VA074600)	
R259:	330.0 1/4 F (VB063700)	
R260, R261, R262,		
R263, R264, R265:	1.3K 1/4 F (VB065800)	
R266, R267:	560.0 1/4 F (VB064300)	
11. Trimmer Potentiometer		
VR128, VR130:	B 22.0K (VA788100) OFFSET A, THD 20 adj.	
VR129, VR131:	B 100.0K (VA788400) THD 0, OFFSET B	
VR132:	B 220 (VA787300) -∞dB adj.	
12. Variable Resistor		
VR102:	2K 5K (VN015900) GAIN	
VR103, VR105, VR107,		
VR109:	C 50K & DMY (VN014700) Q controls	
VR104, VR110:	C50K*3 W50K (VP610100) HI, LO FREQ LEVEL	
VR106, VR108:	C50K*2 W50K (VP609900) HI MID, LO MID	
	FREQ LEVEL	
VR111:	C100KC50K DMY*2 (VP126100) HPF control	
13. Slide Switch		
SW114, SW115,		
SW116, SW117,		
SW118, SW119,		
SW120, SW121,		
SW122, SW123,		
SW124, SW125,		
SW126, SW127,		
SW128, SW129,		
SW130, SW131,		
SW132, SW133,		
SW134:	SSS212 (KA401270) Internal switches	
SW136:	SSSS2-23-01 (VN316400) INPUT CUE(internal)	
14. Push Switch		
SW102, SW111,		
SW135:	SPUJ12 2/2 (VN016900) +48V, MT PRE, ON	
SW103, SW105:	SPUJ12 6/2 (VN017100) 30dB, INSERT PRE	
SW104:	SPUJ21 2/2*2 (VN017200) EQ/HPF	
15. Relay		
RY101, RY102:	DC RY 12W-OH-K (VM640200)	
16. IC Protector		
CP101, CP102, CP103:	ICP-F10 (VF963600)	
17. Test Point		
P101:	IRS-1169 (VE340300)	
18. Flat Cable Assembly		
CN101:	57F50P-HIF50P (VP12930) 215L	
CN102:	57F50P-HIF50P (VN32160) 80L	
19. Connector		
CN103:	SAN & PH(CH INPUT) (VN36650)	
CN104:	SAN & PH(CH D-OUT) (VN36670)	
CN105:	MQ-5P TE (VA252300)	
CN106:	B07P-MQ (VB994800)	
CN107:	PH-11P TE (VB390700)	
CN108:	PH-5P TE (VB390100)	
CN110:	PH-13P TE (VF283100)	
CN111:	PH-4P TE (VB390000)	
CN112:	PH-14P TE (VE352600)	
CN113, CN114, CN130,		
CN131, CN132, CN133,		
CN134, CN135, CN136,		
CN137, CN138:	5532-NA-10P TE (VG20780)	
CN127:	SAN & PH(CH INSER) (VN36660)	

Notes)

Circuit Board:	IN2 (VP507600) XL704A0		
1. LED LD117, LD118:	GL2HY6 YE (VJ471200) ϕ , INSERT ON	13. Push Switch SW112: SW113:	SPUJ 2/2*8 (VN018300) VCA GROUP1-8 SPUJA5 2/2*9 4/ (VN018500) MUTE1-8, S, CUE
2. Push Switch SW107, SW108, SW109, SW110:	SPUJ12 2/2 (VN016900) ϕ , HIGH, LOW, INSERT ON	14. Test Point P101:	IRS-1169 (VE340300)
3. Connector Assembly CN116: CN115:	SAN & PH 5P 80L (VM66620) SAN & PH 11P 80L (VP96470)	15. Connector Assembly CN119: CN118: CN120: CN121:	SAN & PH 4P 60L (VM66720) SAN & PH 13P 60L (VN00260) SAN & PH 14P 60L (VN35890) 5395 & 5480 4P 80L (VA34190)

Notes)

Circuit Board:	IN3 (VN024300) XK365C0
1. IC IC110, IC111: IC107:	NJM2041D-D (IG069200) OP AMP IR2E19 (IG136600) LED DRIVER
2. Transistor Q106, Q107, Q122, Q123, Q124, Q125, Q126: Q108, Q109:	2SC1815 Y, GR (IC1815M0) 2SA1015 O, Y (IA101590)
3. Diode D103, D104, D105, D106, D107, D108, D109, D110, D111, D112, D113, D124, D125, D126, D127, D128, D129, D130, D131, D132, D133, D134:	1SS133, 1SS176 (VB941200)
4. Zener Diode D101:	MTZ5.6B 5.6V (VA007600)
5. LED LD121, LD143: LD122, LD123, LD124, LD127, LD128, LD129, LD130, LD131, LD132, LD133, LD134, LD135, LD136, LD137, LD138, LD139, LD140, LD141, LD142, LD144: LD125, LD126:	GL2PR6 RE (VH325200) PEAK, S GL2HY6 YE (VJ471200) +6, 0, -6, VCA GROUP1-8, MUTE1-8, CUE GL2EG6 GR (VH325300) -10, -20
6. Mylar Cap. C150, C168: C169:	0.0470 50V J (UA354470) 0.1000 50V J (UA355100)
7. Ceramic Cap. C166, C167, C170, C171:	F 0.0100 50V Z (FG644100)
8. Electrolytic Cap. C149, C153: C152: C154: C155:	BP 4.7 25.0V (UK846470) 100.00 16.0V (UJ838100) 4.70 25.0V (UJ846470) 10.00 16.0V (UJ837100)
9. Carbon Resistor R157, R159, R164, R165: R158: R160, R258: R161, R219: R162: R163: R167: R168: R211: R212: R233, R235, R237, R239, R241: R234, R236, R238, R240, R242:	100.0K 1/4 J (HF758100) 47.0K 1/4 J (HF757470) 4.7K 1/4 J (HF756470) 1.0K 1/4 J (HF756100) 20.0K 1/4 J (HF75720) 30.0K 1/4 J (HF75730) 22.0K 1/4 J (HF757220) 10.0K 1/4 J (HF757100) 15.0K 1/4 J (HF757150) 33.0K 1/4 J (HF757330) 12.0K 1/4 J (HF75712) 100.0 1/4 J (HF755100)
10. Metal Film Resistor R213, R215, R218: R216: R214:	10.0K 1/4 F (VA074400) 30.0K 1/4 F (VA074700) 270.0K 1/4 F (VB070600)
11. Resistor Array RA101:	EXB-F11E104F (VN467900)
12. Trimmer Potentiometer VR125: VR126:	B10.0K (VA788000) Meter LED adj. B47.0K (VA788300) VCA reference voltage adj.

Notes)

Circuit Board:	IN5 (VN024500) XK367B0
1. Ceramic Cap. C113: C114:	SL 68P 50V J (FG651680) SL 33P 50V J (FG651330)
2. Metal Film Resistor R104, R105: R106: R118: R119:	2.0K 1/4 F (VB066200) 510.0 1/4 F (VB064200) 8.2K 1/4 F (VB067400) 20.0K 1/4 F (VB068000)
3. Connector CN201: CN202:	MQ-BT 5P TE (VA252100) 07MQ-BT 7P TE (VB99500)

Notes)

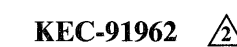
Circuit Board:	IN6 (VN024600) XK411A0
1. Ceramic Cap. C183, C184:	B 470P 50V K (FG612470)
2. Phone Jack JK102: JK103:	2P STEREO (VN327000) INSERT IN, OUT 1P STEREO (VN326800) DIRECT OUT
3. XLM Connector JK101:	XLM-3-31PCH-L (VM651800) INPUT
4. Base Post Connector CN125: CN126: CN128:	PH-4P TE (VB390000) PH-3P TE (VB389900) PH-6P TE (VB390200)

Notes)

Circuit Board:	IN7 (VQ166600) XL705A0
1. Variable Resistor with SW VR121, VR123:	A20K 2/3 SRBM13 (VP001400) SEND LEVEL, PRE/OFF/POST SW
2. Connector CN129:	5533-NAPB10P SE (VG20770)

Notes)

Circuit Board:	IN8 (VQ166700) XL706A0
1. Metal Film Resistor R268:	9.1K 1/4 F (VB067500)
2. Variable Resistor with SW VR120: VR122:	20K*2 4/3 SRBM2 (VQ198700) LEVEL/LEVEL L A20K C20K 4/2 (VP255500) PAN/LEVEL R
3. Connector CN122:	5533-NAPB10P SE (VG20770)

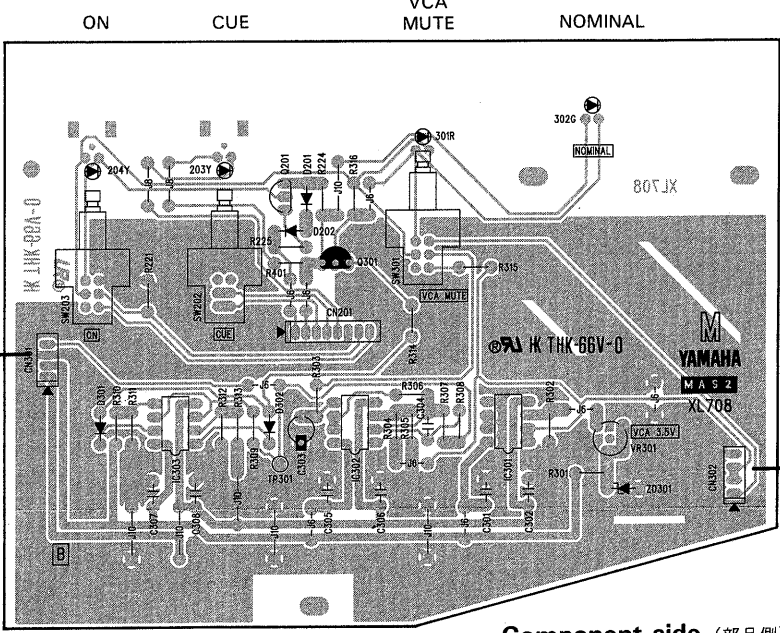


PM4000M/PW4000

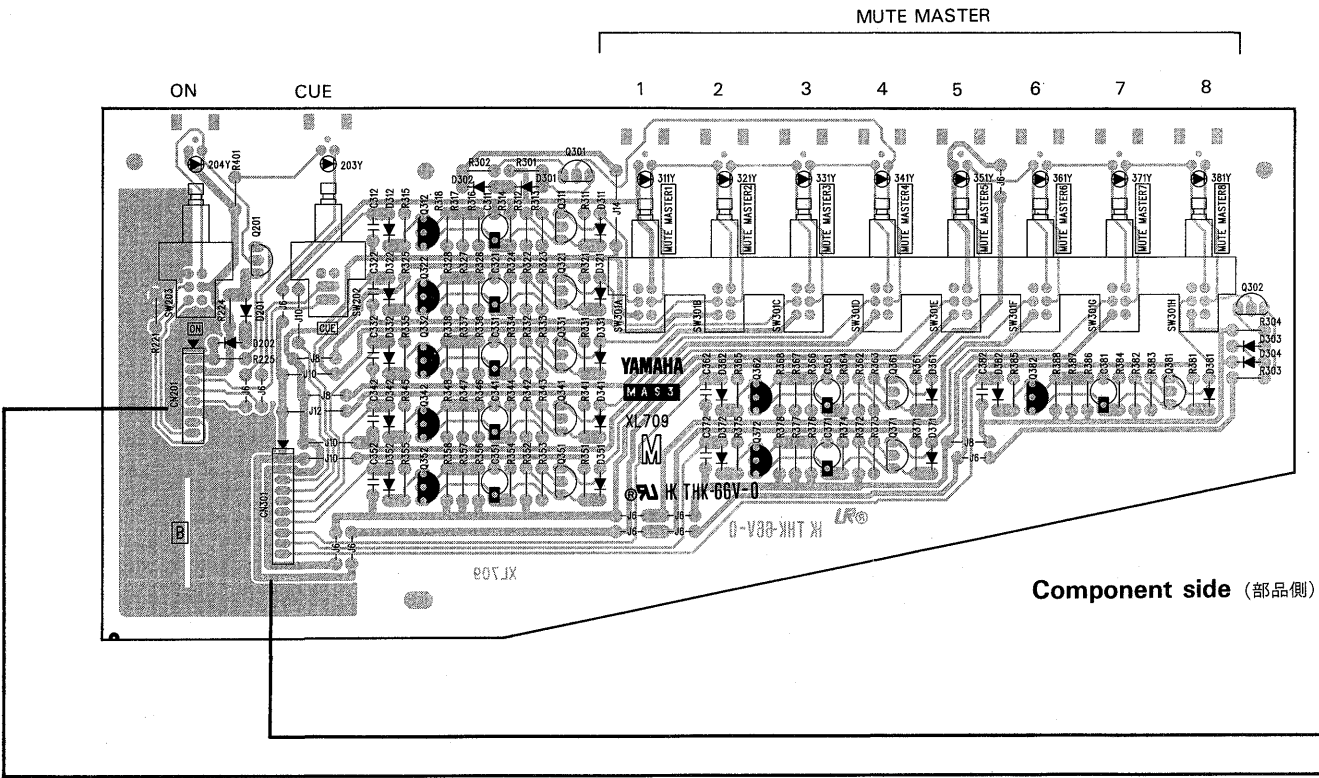
GROUP MASTER 1/GROUP MASTER 2 MODULE (MAS1,MAS2,MAS3,MAS4)

- GROUP MASTER 1 module → MASTER modules 1 to 8
- GROUP MASTER 2 module → MASTER module 9

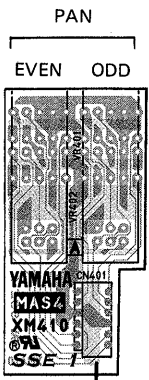
MAS2 Circuit Board-GROUP MASTER1 (MASTER modules 1 to 8)



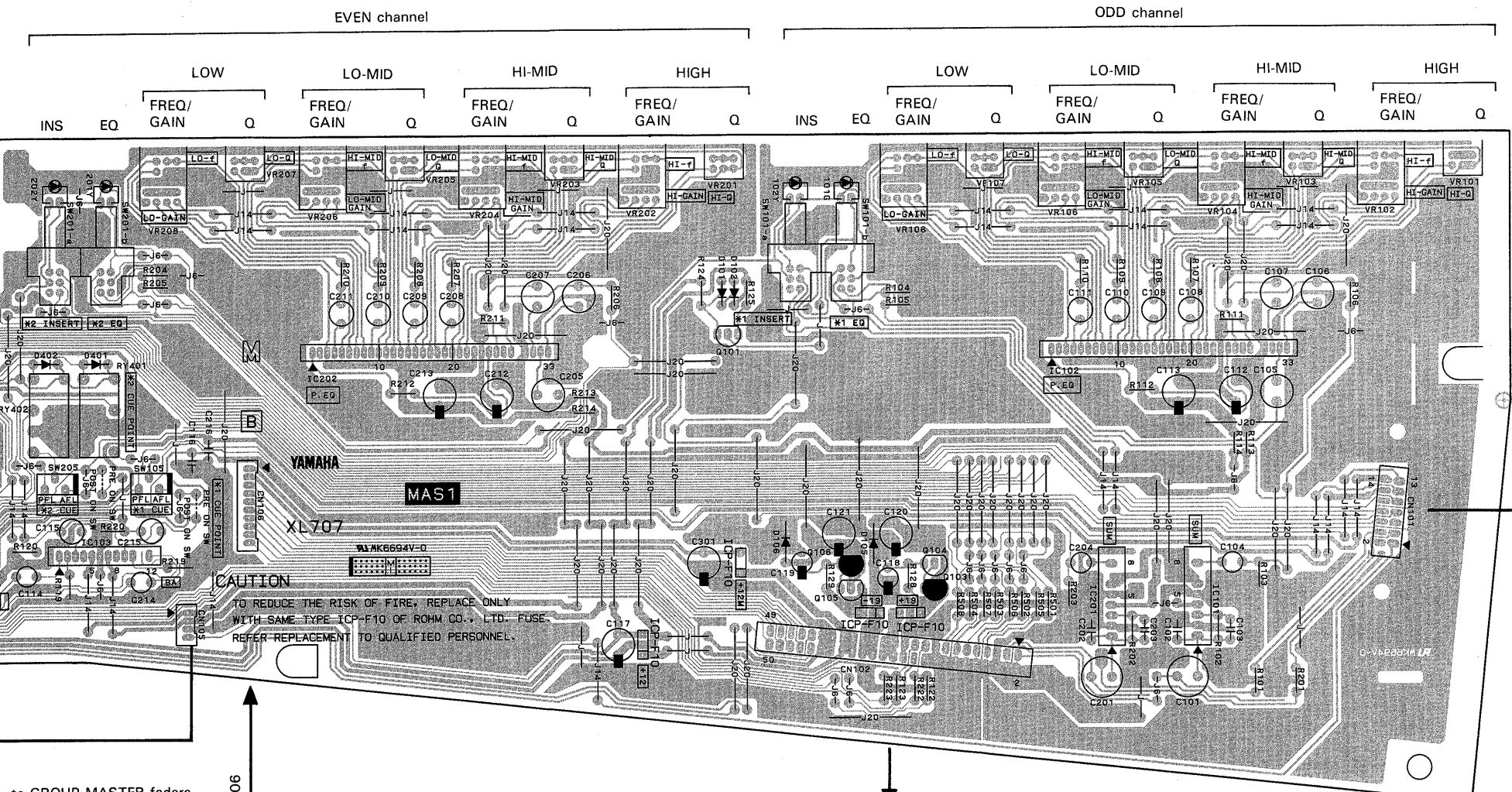
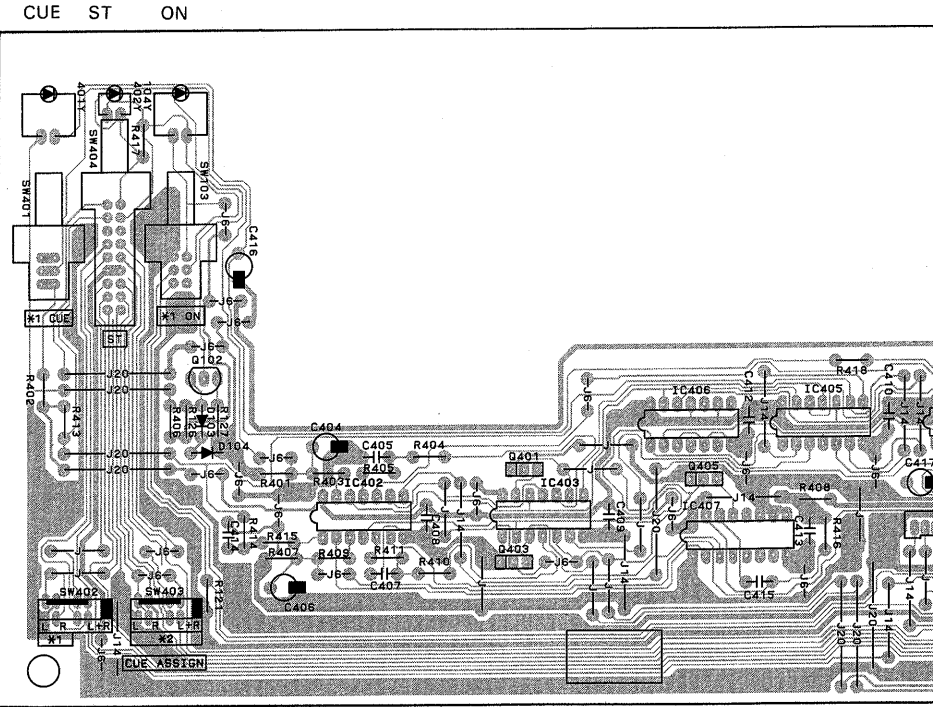
MAS3 Circuit Board-GROUP MASTER 2 (MASTER module 9)



MAS4 Circuit Board



MAS1 Circuit Board

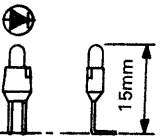


LD104, 203, 204, 311, 321, 331, 341, 351, 361, 371, 381, 401 installing

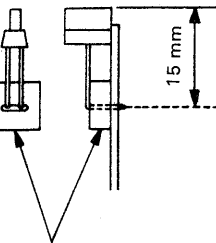


LED holder: VN506100

LD101, 102, 201, 202, 301, 401, 402 installing



LD302 installing



LED holder: VN051400

- 3NA-VP50790 : MAS1
- 3NA-VP50800 : MAS2
- 3NA-VP50810 : MAS3
- 3NA-VQ15570 : MAS4

GROUP MASTER 1/GROUP MASTER 2 MODULE (MAS1,MAS2,MAS3,MAS4)

Notes)

Circuit Board: MAS1 (VP507900) XL707B0

1. IC
IC101, IC201: 917091 (XK869B00) SUM
IC102, IC202: 911308 (XK867B00) PEQ
IC103: 917037 (XK873B00) BA
IC401: UPC78L05J (XC349A00) REGULATOR +5V
IC402: SN74HC14N (IR001450) INVERTER
IC403: SN74HC02N (IR000250) NOR
IC404: SN74HC74N (IR007450) DFF
IC405: SN74HC00N (IR000050) NAND
IC406: SN74HC04N (IR000450) INVERTER
IC407: TC74HC123AP (IR012300) DFF
2. Transistor
Q101, Q102, Q104: 2SC1815 Y, GR (IC1815M0)
Q103: 2SB647 C, D (IB064730)
Q105: 2SD667 C, D (ID066700)
Q106: 2SA1015 O, Y (IA101590)
3. Digital Transistor
Q401, Q402, Q403, Q404, Q405: DTC143XF (VA024600)
4. Diode
D101, D102, D103, D104, D401, D402: 1SS133, 1SS176 (VB941200)
D105, D106: 1SR35-100A (VE170000)
5. LED
LD101, LD201: GL2EG6 GR (VH325300) EQ(x2)
LD102, LD202, LD402: GL2HY6 YE (VJ471200) INS(x2), ST
LD104, LD401: GL5HY40 YE (VP155700) ON, CUE
6. Mylar Cap.
C401, C402: 0.1000 50V J (UA355100)
C405, C407: 0.0100 50V J (UA354100)
C414, C415: 0.3300 50V J (UA355330)
7. Ceramic Cap.
C102, C202: B 220P 50V K (FG612220)
C116, C216: B 1000P 50V K (FG613100)
C103, C203: SL 6P 50V D (FG650600)
8. Electrolytic Cap.
C101, C201: BP-VP 220.00 25.0V (VL049300)
C104, C108, C109, C110, C111, C115, C204, C208, C209, C210, C211, C215: BP-VP 47.00 25.0V (VN321100)
C105, C106, C107, C205, C206, C207: BP-VP 100.00 25.0V (VN452100)
C112, C113, C120, C121, C212: 100.00 25.0V (UJ848100)
C213: 100.00 25.0V (UJ848100)
C114, C214: 10.00 25.0V (UK547100)
C117, C301: 100.00 16.0V (UJ838100)
C118, C119: 10.00 25.0V (UJ847100)
C403: 47.00 16.0V (UJ837470)
C404, C406, C416, C417: 4.70 25.0V (UJ846470)
9. Semiconductive Cera. Cap.
C408, C409, C410, C411, C412, C413: 0.1000 25V Z (VC694800)
10. Carbon Resistor
R103, R104, R105, R120, R121, R203, R204, R205, R220: 100.0K 1/4 J (HF758100)
R111, R112, R211, R212, R414, R416: 47.0K 1/4 J (HF757470)
R124, R126: 12.0K 1/4 J (HF75712)
R125: 100.0 1/4 J (HF755100)
R127: 56.0 1/4 J (HF75456)
R128, R129, R402, R403, R405, R408, R409, R411, R415: 1.0K 1/4 J (HF756100)
R401, R407, R413: 10.0K 1/4 J (HF757100)
R404, R410: 2.0K 1/4 J (HF75620)
R406, R418, R419: 470.0 1/4 J (HF75547)
R417: 560.0 1/4 J (HF755560)
11. Flame Proof C. Resistor
R113, R114, R213, R214: 10.0 1/4 J (HV754100)
12. Metal Film Resistor
R101, R201: 36.0K 1/4 F (VB068500)
R102, R202: 100.0K 1/4 F (VB069600)
R106, R206: 15.0K 1/4 F (VA074600)
R107, R108, R109, R110, R207: 3.0K 1/4 F (VB066600)
R122, R123, R222, R223: 18.0K 1/4 F (VB067900)
R119, R219: 4.7K 1/4 F (VA074100)
R208, R209, R210: 3.0K 1/4 F (VB066600)
R501, R502, R503, R504, R505, R506, R507, R508: 27.0K 1/4 F (VB068300)
13. Variable Resistor
VR101, VR103, VR105, VR107, VR201, VR203, VR205, VR207: C 50K & DMY (VN014700) Q controls
VR102, VR104, VR106, VR108, VR202, VR204, VR206, VR208: C50K*2 W50K & DMY (VN015300) EQ FREQ/LEVEL controls
14. Slide Switch
SW105, SW205: SSS212 (KA401270) PFL/AFL CUE(internal sw)
SW402, SW403: SSSS2-23-01 (VN316400) L/R/L + R CUE
ASSIGN(internal sw)
15. Push Switch
SW101, SW201: SPUJ21 2/2*2 (VN017200) EQ(x2)
SW103: SPUJ12 2/2 (VN016900) ON
SW401: SPUY12 (VQ428400) CUE
SW404: SPUJ12 6/2 (VN017100) ST
16. Relay
RY401, RY402: DC RY 12W-OH-K (VM640200)
17. IC Protector
CP101, CP102, CP103, CP301: ICP-F10 (VF963600)
18. Flat Cable Assembly
CN101: 57F14P-HIF14P (VN32200) 180L
CN102: 57F50P-HIF50P (VN32160) 80L
19. Connector
CN103: 5395 & 5480(MAS) (VP51420)
CN104: PH-8P TE (VB390400)
CN105: PH-4P TE (VB390000)
CN106: PH-10P TE (VB390600)
CN107: 5532-NA 12P TE (VQ15590)

Notes)

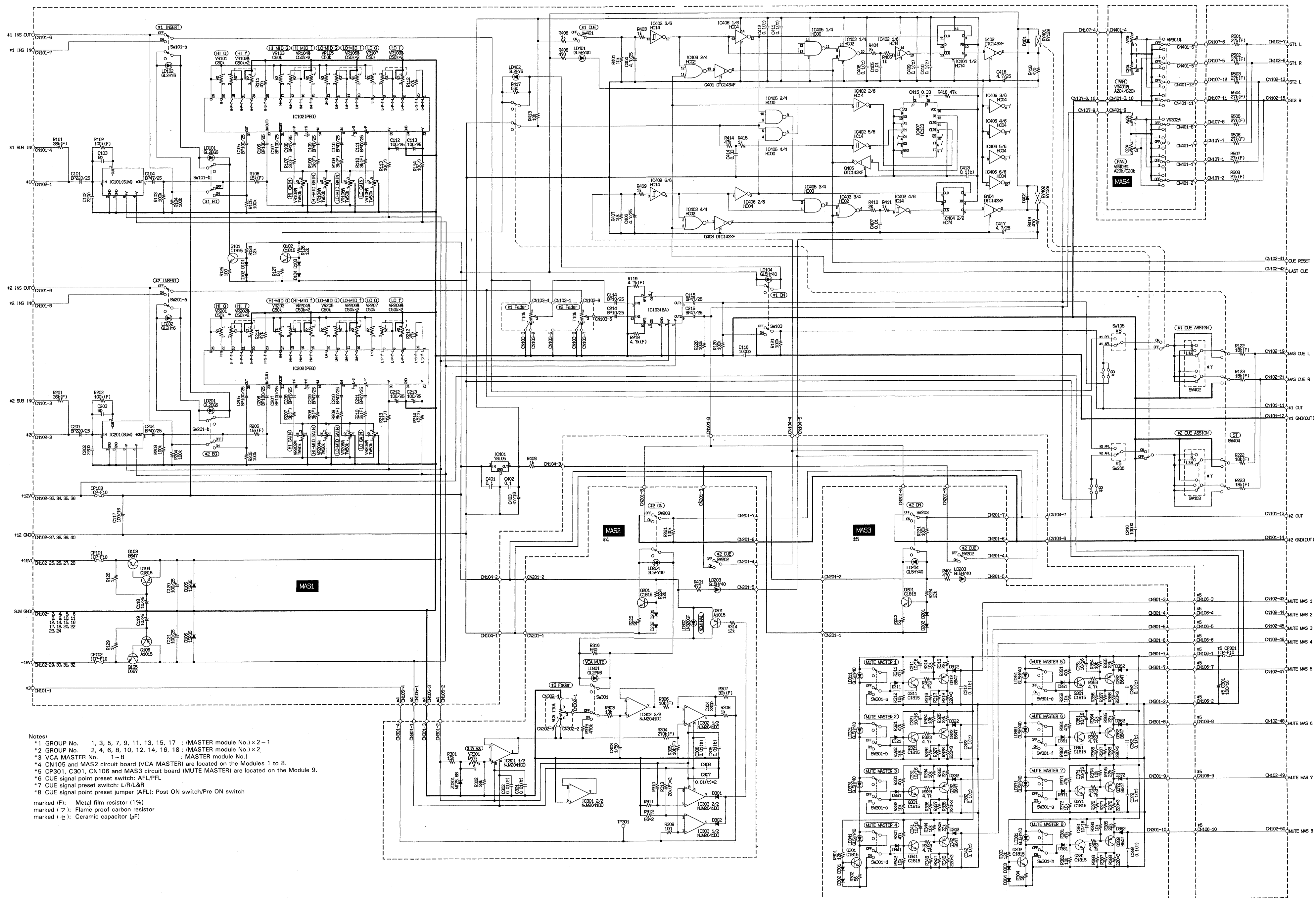
Circuit Board:	MAS2 (VP508000) XL708B0
1. IC IC301, IC302, IC303:	NJM2041D-D (IG069200) OP AMP
2. Transistor Q201: Q301:	2SC1815 Y, GR (IC1815M0) 2SA1015 O, Y (IA101590)
3. Diode D201, D202, D301, D302:	1SS133, 1SS176 (VB941200)
4. Zener Diode D301:	MTZ5.6B 5.6V (VA007600)
5. LED LD203, LD204: LD301: LD302:	GL5HY40 YE (VP155700) CUE, ON GL2PR6 RE (VH325200) VCA MUTE LN320GPH GR (VQ457600) NOMINAL
6. Ceramic Cap. C301, C302, C305, C306, C307, C308: C304:	F 0.0100 50V Z (FG644100) B 330P 50V K (FG612330)
7. Electrolytic Cap. C303:	1.00 50.0V (UJ866100)
8. Carbon Resistor R221: R224, R314: R225, R311, R312: R301: R302: R303: R308: R309: R315: R316: R401:	100.0K 1/4 J (HF758100) 12.0K 1/4 J (HF75712) 56.0 1/4 J (HF75456) 15.0K 1/4 J (HF757150) 33.0K 1/4 J (HF757330) 10.0K 1/4 J (HF757100) 1.0K 1/4 J (HF756100) 100.0 1/4 J (HF755100) 470.0K 1/4 J (HF758470) 560.0 1/4 J (HF755560) 470.0 1/4 J (HF75547)
9. Trimmer Potentiometer VR301:	B47.0K (VA788300) VCA 3.5V adj.
10. Metal Film Resistor R304: R305, R306: R307: R310, R313:	270.0K 1/4 F (VB070600) 10.0K 1/4 F (VA074400) 30.0K 1/4 F (VA074700) 20.0K 1/4 F (VB068000)
11. Push Switch SW202: SW203, SW301:	SPUY12 (VQ428400) CUE SPUJ12 2/2 (VN016900) ON, VCA MUTE
12. Test Point P301:	IRS-1169 (VE340300)
13. Connector Assembly CN201: CN301: CN302:	SAN & PH 8P 250L (VQ25130) SAN & PH 4P 300L (VQ25140) 5395 & 5480 4P 80L (VA34190)

Notes)

Circuit Board:	MAS3 (VP508100) XL709B0
1. Transistor Q201, Q301, Q302, Q311, Q321, Q331, Q341, Q351, Q361, Q371, Q381: Q312, Q322, Q332, Q342, Q352, Q362, Q372, Q382:	2SC1815 Y, GR (IC1815M0) 2SB647 C, D (IB064730)
2. Diode D201, D202, D301, D302, D303, D304, D311, D312, D321, D322, D331, D332, D341, D342, D351, D352, D361, D362, D371, D372, D381, D382:	1SS133, 1SS176 (VB941200)
3. LED LD203, LD204, LD311, LD321, LD331, LD341, LD351, LD361, LD371, LD381:	GL5HY40 YE (VP155700) CUE, ON, MUTE MASTER1-8
4. Electrolytic Cap. C311, C321, C331, C341, C351, C361, C371, C381:	10.00 16.0V (UJ837100)
5. Semiconductive Cera. Cap. C312, C322, C332, C342, C352, C362, C372, C382:	0.1000 25V Z (VC694800)
6. Carbon Resistor R221: R224, R301, R303: R225, R302, R304: R311, R321, R331, R341, R351, R361, R371, R381: R312, R314, R322, R324, R332, R334, R342, R344, R352, R354, R362, R364, R372, R374, R382, R384: R313, R323, R333, R343, R353, R363, R373, R383: R315, R325, R335, R345, R355: R316, R317, R318, R326, R327, R328, R336, R337, R338, R346, R347, R348, R356, R357, R358, R366, R367, R368, R376, R377, R378, R386, R387, R388: R365, R375, R385: R401:	100.0K 1/4 J (HF758100) 12.0K 1/4 J (HF75712) 56.0 1/4 J (HF75456) 47.0K 1/4 J (HF757470) 10.0K 1/4 J (HF757100) 4.7K 1/4 J (HF756470) 22.0K 1/4 J (HF757220) 220.0 1/4 J (HF755220) 22.0K 1/4 J (HF757220) 470.0 1/4 J (HF75547)
7. Push Switch SW202: SW203: SW301:	SPUY12 (VQ428400) CUE SPUJ12 2/2 (VN016900) ON SPUJ 2/2*8 (VN023900) MUTE MASTER1-8
8. Connector Assembly CN201: CN301:	SAN & PH 8P 200L (VP91350) SAN & PH 10P 300L (VQ25220)

Notes)

Circuit Board:	MAS4 (VQ162100) XM410A0
1. Variable Resistor with SW VR401, VR402:	A20K C20K SRBM1 (VQ154300) PAN/PAN DESTINATION ASSIGN
2. Connector CN401:	5533-NAPB12P SE (VQ15600)



- Notes
- *1 GROUP No. 1, 3, 5, 7, 9, 11, 13, 15, 17 : (MASTER module No.) × 2 - 1
 - *2 GROUP No. 2, 4, 6, 8, 10, 12, 14, 16, 18 : (MASTER module No.) × 2
 - *3 VCA MASTER No. 1 - 8 : MASTER module No.)
 - *4 CN105 and MAS2 circuit board (VCA MASTER) are located on the Modules 1 to 8.
 - *5 CP301, C301, CN106 and MAS3 circuit board (MUTE MASTER) are located on the Module 9.
 - *6 CUE signal point preset switch: AFL/PFL
 - *7 CUE signal point preset switch: L/R/L&R
 - *8 CUE signal point preset jumper (AFL): Post ON switch/Pre ON switch
- marked (F): Metal film resistor (1%)
 marked (7): Flame proof carbon resistor
 marked (t): Ceramic capacitor (μF)

STEREO MASTER MODULE (ST1)

Notes)

Circuit Board: ST1 (VP508200) XL710B0

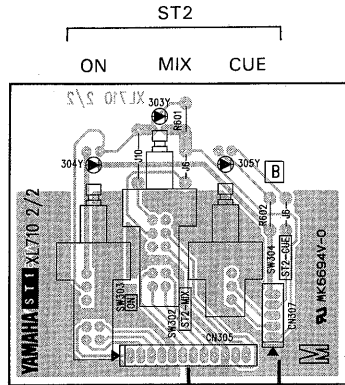
1. IC
IC101, IC201, IC301, IC401:
IC102, IC202, IC302, IC402:
IC103, IC303:
IC501:
IC502:
IC503:
IC504:
2. Transistor
Q101:
Q102:
Q103, Q105, Q106:
Q104, Q505, Q506:
3. Digital Transistor
Q501, Q502, Q503, Q504:
4. Diode
D101, D102, D103, D104, D501, D502, D503, D504:
D105, D106:
5. LED
LD101, LD301:
LD102, LD103, LD302, LD303:
LD104, LD304, LD305, LD501:
6. Mylar Cap.
C501, C502:
C505, C507:
7. Ceramic Cap.
C102, C202, C302, C402:
C103, C203, C303, C403:
C116, C316:
- 917091 (XK869B00) SUM
911308 (XK867B00) PEQ
917037 (XK873B00) BA
UPC78L05J (XC349A00) REGULATOR +5V
SN74HC14N (IR001450) INVERTER
SN74HC02N (IR000250) NOR
SN74HC74N (IR007450) DFF
2SB647 C, D (IB064730)
2SD667 C, D (ID066700)
2SC1815 Y, GR (IC1815M0)
2SA1015 O, Y (IA101590)
DTC143XF (VA024600)
1SS133, 1SS176 (VB941200)
1SR35-100A (VE170000)
GL2EG6 GR (VH325300) EQ(x2)
GL2HY6 YE (VJ471200) INS, MIX, INS, MIX
GL5HY40 YE (VP155700) ON, ON, CUE, CUE
0.1000 50V J (UA355100)
0.0100 50V J (UA354100)
B 220P 50V K (FG612220)
SL 1P 50V C (FG650100)
B 1000P 50V K (FG613100)

8. Electrolytic Cap.
C101, C201, C301, C401:
C104, C108, C109, C110, C111, C115, C204, C208, C209, C210, C211, C215, C304, C308, C309, C310, C311, C315, C404, C408, C409, C410, C411, C415:
C105, C106, C107, C205, C206, C207, C305, C306, C307, C405, C406, C407:
C112, C113, C121, C122, C212, C213, C312, C313, C412, C413, C123:
C114, C214, C314, C414:
C119, C120:
C503:
C504, C506, C511, C512, C513, C514:
9. Semiconductive Cera. Cap.
C508, C509, C510:
10. Carbon Resistor
R103, R104, R105, R120, R121, R203, R204, R205, R220, R221, R303, R304, R305, R320, R321, R403, R404, R405, R420, R421:
R111, R112, R211, R212, R311, R312, R411, R412:
R125, R126, R502, R503, R505, R508, R509, R511:
R127, R129:
R128:
R130:
R131, R601:
R501, R507, R513, R515:
R504, R510:
R506, R518, R519, R602:
R512, R514, R516, R517:
- BP-VP 220.00 25.0V (VL049300)
BP-VP 47.00 25.0V (VN321100)
BP-VP 100.00 25.0V (VN452100)
100.00 16.0V (UJ838100)
BP 10.00 25.0V (UK547100)
10.00 25.0V (UJ847100)
47.00 16.0V (UJ837470)
4.70 25.0V (UJ846470)
0.1000 25V Z (VC694800)
100.0K 1/4 J (HF758100)
47.0K 1/4 J (HF757470)
1.0K 1/4 J (HF756100)
12.0K 1/4 J (HF757120) (HF75712)
100.0 1/4 J (HF755100)
56.0 1/4 J (HF754560)
560.0 1/4 J (HF755560)
10.0K 1/4 J (HF757100)
2.0K 1/4 J (HF756200)
470.0 1/4 J (HF755470)
4.7K 1/4 J (HF756470)

11. Flame Proof C. Resistor
R113, R114, R213, R214, R313, R314, R413, R414:
12. Metal Film Resistor
R101, R201, R301, R401:
R102, R202, R302, R402:
R106, R206, R306, R406:
R107, R108, R109, R110, R207, R208, R209, R210, R307, R308, R309, R310, R407, R408, R409, R410:
R119, R219, R319, R419:
R124, R132, R224, R225, R324, R325, R424, R425:
R133, R134, R226, R227, R326, R327, R426, R427:
13. Variable Resistor
VR101, VR103, VR105, VR107, VR301, VR303, VR305, VR307:
VR102, VR104, VR106, VR108, VR302, VR304, VR306, VR308:
14. Slide Switch
SW105, SW305:
15. Push Switch
SW101, SW301:
SW102, SW304:
SW103, SW104:
SW302, SW303:
16. Relay
RY501, RY502, RY503, RY504:
17. IC Protector
CP101, CP102, CP103:
- 10.0 1/4 J (HV754100)
36.0K 1/4 F (VB068500)
100.0K 1/4 F (VB069600)
15.0K 1/4 F (VA074600)
3.0K 1/4 F (VB066600)
4.7K 1/4 F (VA074100)
18.0K 1/4 F (VB067900)
7.5K 1/4 F (VA074300)
C50K *2 (VN014900) Q controls
C50K *4 W50K *2 (VN015500) EQ FREQ./LEVEL controls
SSSS2-22-01 (VN316300) ST1, ST2 CUE(internal sw)
SPUJ21 4/2 *2 (VN017500) EQ/INS
SPUJ12 (VQ428400) CUE
SPUJ12 4/2 (VN017000) ON, MIX, MIX, ON
DC RY 12W-OH-K (VM640200)
ICP-F10 (VF963600)

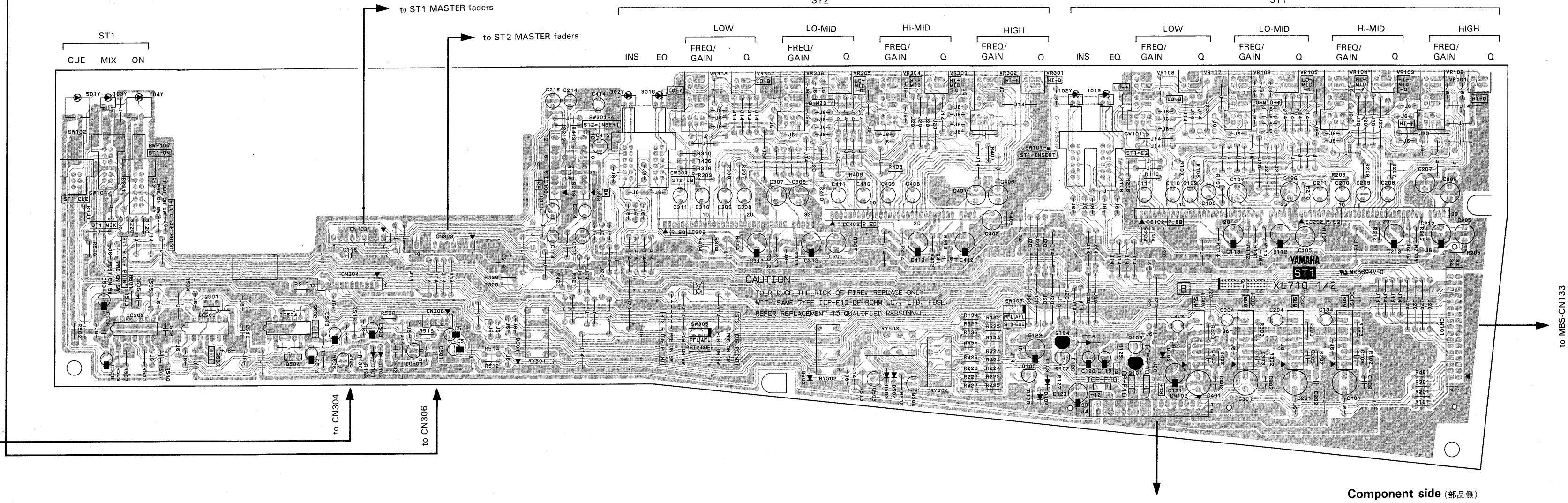
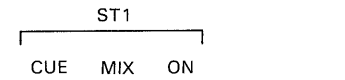
18. Flat Cable Assembly
CN101:
CN102:
19. Connector
CN103:
CN303:
CN304:
CN306:
CN305:
CN307:
- 57F36P-HIF34P (VN32190) 180L
57F36P-HIF34P (VN32180) 80L
5395 & 5480(ST-1)(VP51430)
5395 & 5480(ST-2)(VP51440)
PH-12P TE (VB390800)
PH-5P TE (VB390100)
SAN & PH 12P 160L (VQ25160)
SAN & PH 5P 200L (VQ25150)

ST1 -2/2 Circuit Board

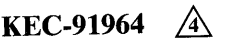


Component side (部品側)

ST1 -1/2 Circuit Board



Component side (部品側)

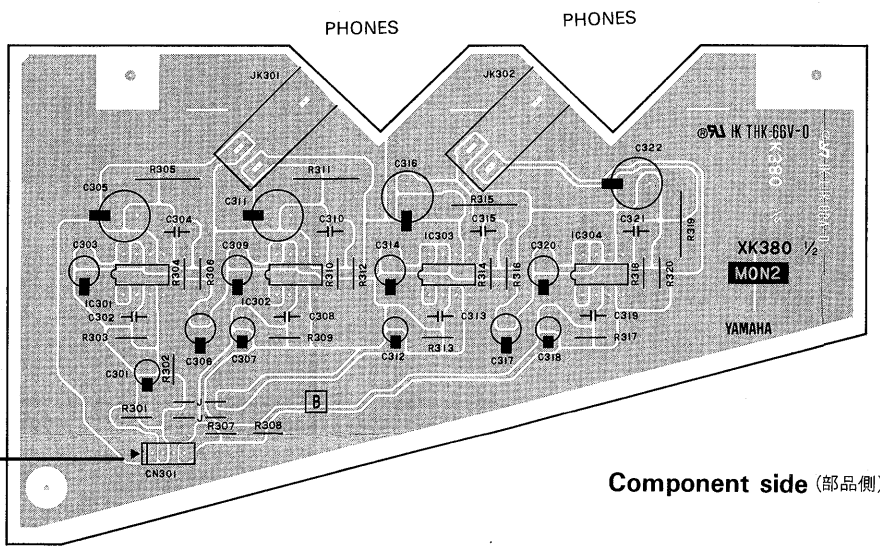


PM4000M/PW4000

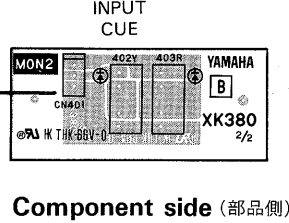
1172

■ TALKBACK MODULE (T/C1, T/C2, MON2)

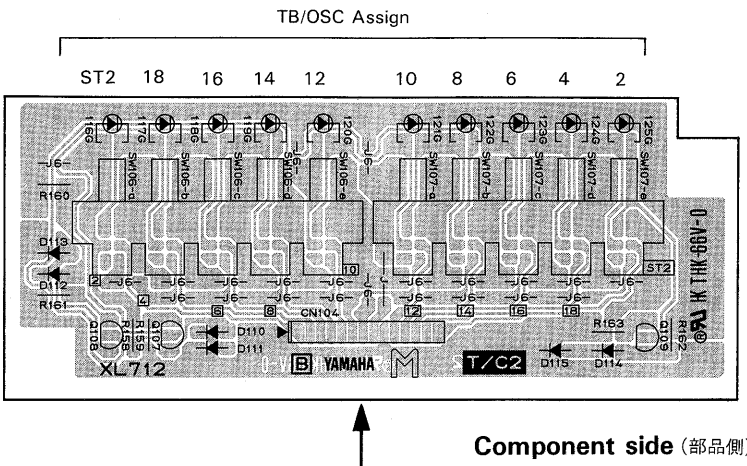
● MON2-1/2 Circuit Board



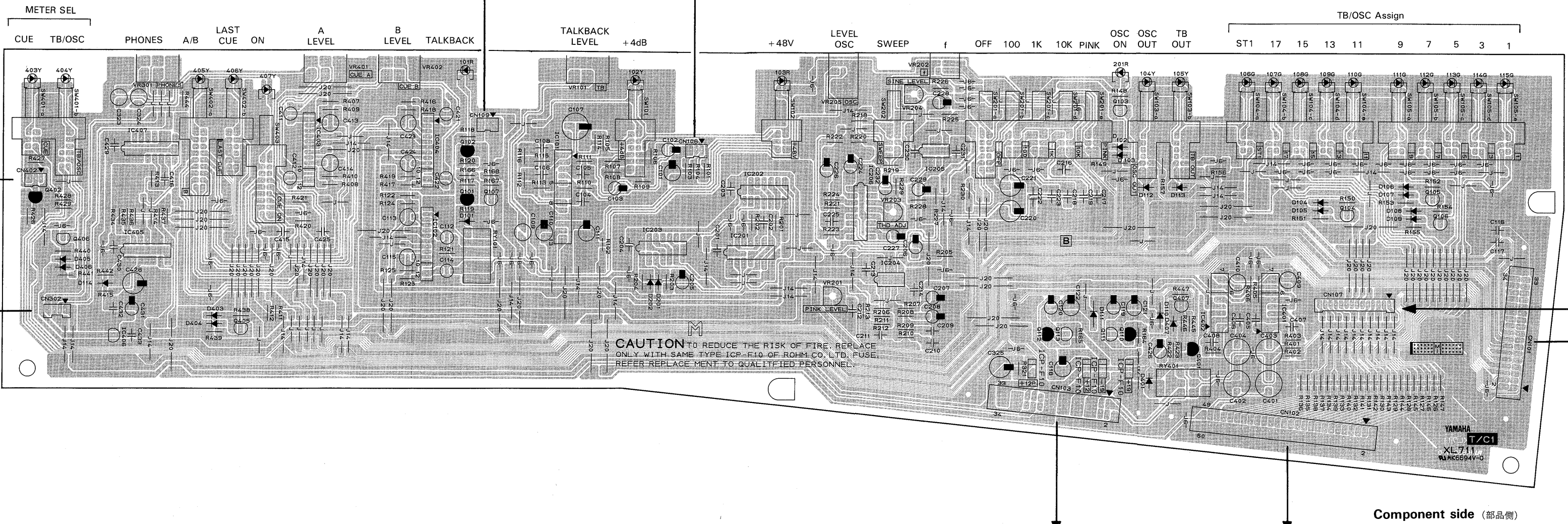
● MON2-2/2 Circuit Board



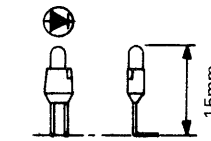
● T/C2 Circuit Board



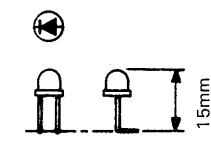
● T/C1 Circuit Board



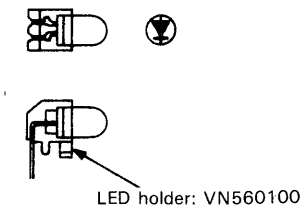
• LD102~125, 403~406 installing



• LD101, 201 installing



• LD427 installing



3NA-VP50840 △ : T/C1
3NA-VP50850 △ : T/C2
3NA-VN02590 △ : MON2

Notes)

Circuit Board: T/C1 (VP508400) XL711B0

1. IC

IC101:	917090 (XK866A00) HA	R110, R111:	10.0 1/4 J (HF754100)
IC102, IC403, IC404:	917037 (XK873B00) BA	R112, R116:	470.0 1/4 J (HF75547)
IC201:	TC4030BP (IG001790) XOR	R117, R118, R413,	
IC202, IC203:	TC4006BP (IG001680) SHIFT REGISTER	R414, R415, R422,	
IC204, IC205:	NJM2041D-D (IG069200) OP AMP	R423, R436, R437,	
IC206:	XR-2206CP (XA243A00) FUNCTION GENE.	R442:	4.7K 1/4 J (HF756470)
IC401, IC402:	917091 (XK869B00) SUM	R119, R166, R168,	
IC405:	SN74HC03N (IR000350) NAND	R202, R204, R230,	
IC406:	UPC78L05J (XC349A00) REGULATOR +5V	R427, R428, R429,	
IC407:	TC74HC123AP (IR012300) DFF	R434:	10.0K 1/4 J (HF757100)
		R120:	27.0K 1/4 J (HF757270)
2. Transistor

Q101, Q102, Q112,		R148, R150, R152,	
Q401, Q402:	2SA1015 O, Y (IA101590)	R154, R438, R440:	12.0K 1/4 J (HF75712)
Q103, Q104, Q105,		R149, R151, R153,	
Q106, Q107, Q111,		R155, R210, R439,	
Q405, Q406, Q407:	2SC1815 Y, GR (IC1815M0)	R441:	100.0 1/4 J (HF755100)
Q110:	2SB647 C, D (IB064730)	R164, R165, R208,	
Q113:	2SD667 C, D (ID066700)	R213, R226:	1.0K 1/4 J (HF756100)
		R167, R207:	3.3K 1/4 J (HF756330)
3. Diode

D101, D102, D103,		R201:	33.0K 1/4 J (HF757330)
D104, D105, D106,		R206:	6.8K 1/4 J (HF756680)
D107, D108, D109,		R209:	330.0 1/4 J (HF75533)
D112, D113, D114,		R211, R224:	22.0K 1/4 J (HF757220)
D201, D202, D401,		R212:	3.9K 1/4 J (HF756390)
D403, D404, D405,		R221, R222:	5.6K 1/4 J (HF756560)
D406, D407:	1SS133, 1SS176 (VB941200)	R229:	39.0 1/4 J (HF75439)
D110, D111:	1SR35-100A (VE170000)	R426:	15.0K 1/4 J (HF757150)
		R435, R445:	10.0K 1/4 J (HF757100)
		R444:	2.7K 1/4 J (HF756270)
		R446:	47.0K 1/4 J (HF757470)
		R447:	4.7K 1/4 J (HF756470)
4. LED

LD101, LD201:	GL3PR8 RE (VG261500) TALKBACK ON, OSC ON	10. Flame Proof C. Resistor	
LD103:	GL2PR6 RE (VH325200) +48V	R102:	390.0 1/4 J (HV755390)
LD106, LD107, LD108,		R321:	2.2 1/4 J (HV753220)
LD109, LD110, LD111,			
LD112, LD113, LD114,	GL2EG6 GR (VH325300) ST1, 17, 15, 13, 11, 9,	11. Metal Film Resistor	
LD115:	7, 5, 3, 1	R103, R104:	6.8K 1/4 F (VB067300)
		R105, R106, R107:	2.0K 1/4 F (VB066200)
LD102, LD104, LD105,		R108:	300.0 1/4 F (VB063600)
LD403, LD404, LD405,	GL2HY6 YE (VJ471200) +4dB, OSC OUT, TB	R109, R407, R408,	
LD406:	OUT, CUE, TB/OSC, A/B, LAST CUE	R416, R417:	4.7K 1/4 F (VA074100)
	GL5HY40 YE (VP155700) ON	R113, R115:	2.2K 1/4 F (VB066300)
		R114:	43.0 1/4 F (VB061600)
LD407:		R122, R123:	1.2K 1/4 F (VB065700)
		R126, R127, R128,	
		R129, R130, R131,	
		R132, R133, R134,	
		R135, R136, R137,	
		R138, R139, R140,	
		R141, R142, R143,	
		R144, R145, R146,	
		R147:	36.0K 1/4 F (VB068500)
		R218, R225:	12.0K 1/4 F (VB067600)
		R219, R223:	9.1K 1/4 F (VB067500)
		R401, R402:	18.0K 1/4 F (VB067900)
		R403, R404:	27.0K 1/4 F (VB068300)
5. Mylar Cap.

C104, C105, C211:	470P 50V J (UA352470)	12. Trimmer Potentiometer	
C209, C212, C432,		VR201, VR204:	B100.0K (VA788400) PINK LEVEL, SINE LEVEL
C433:	0.1000 50V J (UA355100)	VR203:	B470 (VA787500) THD ADJ
C210:	0.0330 50V J (UA354330)		
C216:	4700P 50V J (UA353470)	13. Variable Resistor	
C217:	820P 50V J (UA352820)	VR101:	A10K & DMY (VN015700) TB input LEVEL
C218:	0.0470 50V J (UA354470)	VR202:	C100K *2 (VN015100) (SWEEP control)
C219:	8200P 50V J (UA353820)	VR205:	A20 & DMY DMY *2 (VP126000) LEVEL OSC
C222:	0.4700 50V J (UA255470)	VR301, VR401, VR402:	A10K *2 (VN015800) PHONES, A-LEVEL, B LEVEL
C223:	0.0820 50V J (UA354820)		
C416:	0.2200 50V J (UA355220)		
6. Ceramic Cap.

C106, C108:	B 470P 50V K (FG612470)	14. Ferrite Bead	
C116, C117, C415,		L101:	BL02RN1-R62 (GE300600)
C425:	B 1000P 50V K (FG613100)		
C202:	SL 100P 50V J (FG652100)	15. Push Switch	
C213, C214, C225,		SW101:	SPUJ12 4/2 (VN017000) +4dB
C230, C231:	F 0.0100 50V Z (FG644100)	SW102, SW202:	SPUJ12 2/2 (VN016900) +48V, SWEEP
C405, C406:	B 220P 50V K (FG612220)	SW103:	SPUJ21 4/2 *2 (VN017500) TB OUT/OSC OUT
C407, C408:	SL 22P 50V J (FG651220)	SW104, SW105:	SPUJ 2/2 *5 (VN018000) 11, 13, 15, 17, ST1, 1,
			3, 5, 7, 9
		SW201:	SPUJ5 4/2 2/2 *4 (VN018700)
			OFF/100/1K/10K/PINK
		SW401:	SPUJ21 2/2 4/2 (VN017300) CUE/TB/OSC
		SW402:	SPUJ21 6/2 4/2 (VQ154200) A/B/LAST CUE
		SW403:	SPUJ12 6/2 (VN017100) ON
7. Electrolytic Cap.

C101:	47.00 50.0V (UJ867470)	16. Relay	
C102, C103:	10.00 50.0V (VJ097400)	RY101, RY401:	DC RY 12W-OH-K (VM640200)
C107:	1000 6.3V (UJ819100)		
C109, C113, C115,		17. IC Protector	
C323, C324, C409,		CP101, CP102, CP103,	
C410, C413, C414,		CP104:	ICP-F10 (VF963600)
C423, C424:	BP-VP 47.00 25.0V (VN321100)		
C110, C111, C121,			
C122:	100.00 25.0V (UJ848100)	18. Flat Cable Assembly	
C112, C114, C411,		CN101:	57F36P-HIF34P (VN32190) 180L
C412, C421, C422:	BP 10.00 25.0V (UK547100)	CN102:	57F50P-HIF50P (VN32160) 80L
C118:	100.00 16.0V (UJ838100)	CN103:	57F36P-HIF34P (VN32180) 80L
C119, C120, C224,			
C226, C426:	10.00 25.0V (UJ847100)	19. Base Post Connector	
C205:	22.00 16.0V (UJ837220)	CN106, CN109, CN402:	PH-3P TE (VB389900)
C208:	0.33 50.0V (UJ865330)	CN107:	PH-14P TE (VE352600)
C206, C207, C229:	1.00 50.0V (UJ866100)	CN302:	PH-4P TE (VB390000)
C220, C221:	220.00 25.0V (UJ848220)		
C227, C228, C232:	47.00 25.0V (UJ847470)		
C325, C428:	220.00 16.0V (UJ838220)		
C401, C402, C403,			
C404:	BP-VP 220.00 25.0V (VLO49300)		
C431:	47.00 16.0V (UJ837470)		
8. Semiconductive Cera. Cap.

C201, C203, C204,			
C429, C430:	0.1000 25V Z (VC694800)		
9. Carbon Resistor

R101, R121, R124,			
R125, R156, R157,			
R203, R205, R220,			
R227, R228, R405,			
R406, R409, R410,			
R411, R412, R418,			
R419, R420, R421:	100.0K 1/4 J (HF758100)		

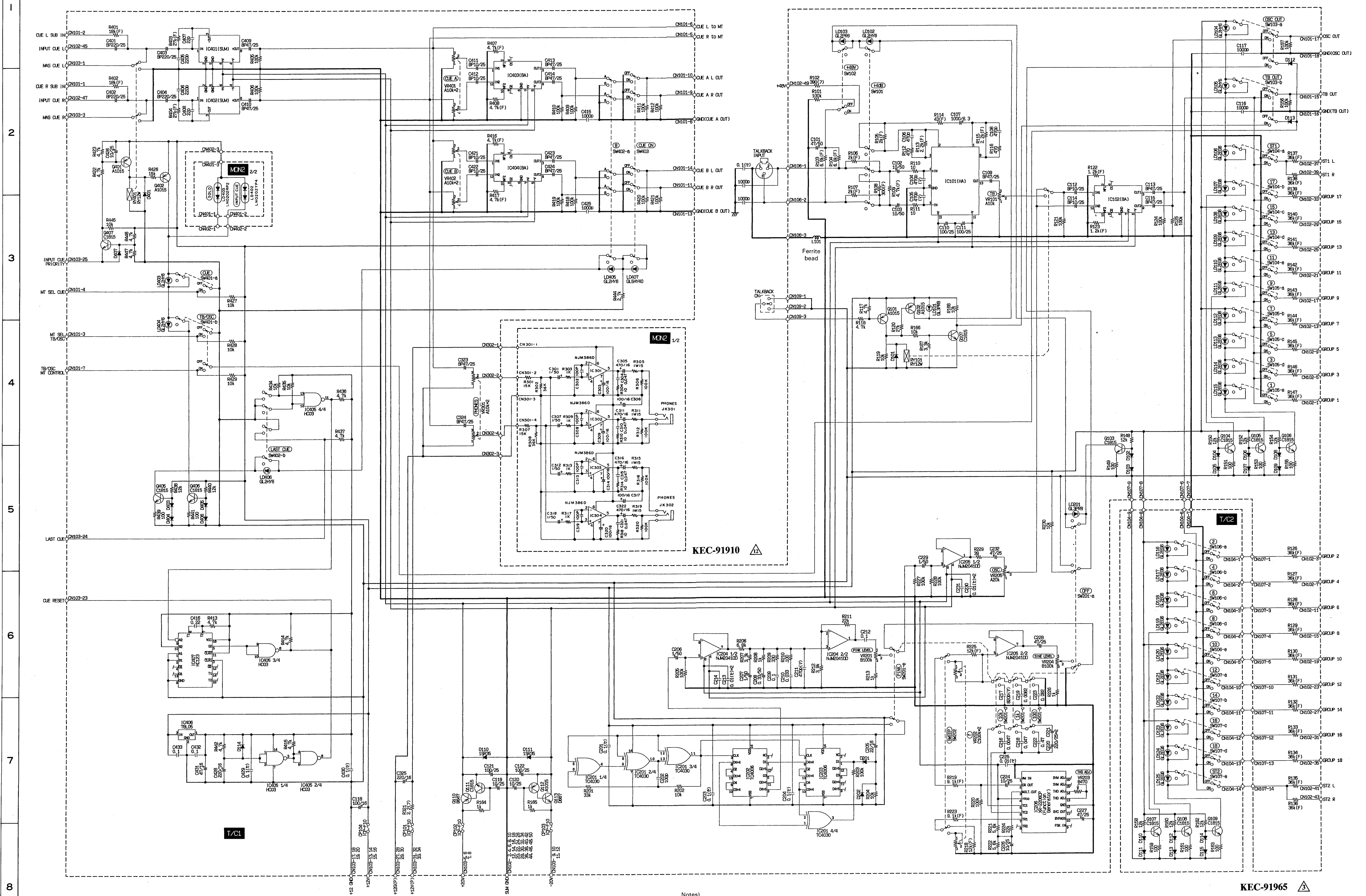
Notes)

- Circuit Board: T/C2 (VP508500) XL712B0
1. Transistor
Q107, Q108, Q109: 2SC1815 Y, GR (IC1815M0)
 2. Diode
D110, D111, D112,
D113, D114, D115: 1SS133, 1SS176 (VB941200)
 3. LED
LD116, LD117, LD118,
LD119, LD120, LD121,
LD122, LD123, LD124,
LD125: GL2EG6 GR (VH325300) 2, 4, 6, 8, 10, 12, 14,
16, 18, ST2
 4. Carbon Resistor
R158, R160, R162: 12.0K 1/4 J (HF75712)
R159, R161, R163: 100.0 1/4 J (HF755100)
 5. Push Switch
SW106, SW107: SPUJ 2/2*5 (VN018000) 2, 4, 6, 8, 10, 12, 14,
16, 18, ST2
 6. Connector Assembly
CN104: SAN & PH 14P 60L (VN35890)

Notes)

- Circuit Board: MON2 (VN025900) XK380B0
1. IC
IC301, IC302, IC303,
IC304: NJM386D 0.5W 1CH (IG056600)
 2. LED Display
LD402: LN0202YP4 (VA273600) INPUT CUE
LD403: LN0202RP2 (VA273400) not used
 3. Mylar Cap.
C304, C310, C315,
C321: 0.0470 50V J (UA354470)
 4. Ceramic Cap.
C302, C308, C313,
C319: SL 100P 50V J (FG652100)
 5. Electrolytic Cap.
C301, C307, C312,
C318: 1.00 50.0V (UJ866100)
C303, C306, C309,
C314, C317, C320: 100.00 16.0V (UJ838100)
C305, C311, C316,
C322: 470.00 16.0V (UJ838470)
 6. Carbon Resistor
R301, R307: 15.0K 1/4 J (HF757150)
R302, R308: 36.0K 1/4 J (HF75736)
R303, R309, R313,
R317: 1.0K 1/4 J (HF756100)
R304, R310, R314,
R318: 10.0 1/4 J (HF754100)
R306, R312, R316,
R320: 100.0K 1/4 J (HF758100)
 7. Metal Oxide Film Resistor
R305, R311, R315,
R319: 15.0 1W J (VC742900)
 8. Phone Jack
JK301, JK302: HLJ0520 BL (LB301690) PHONES
 9. Connector Assembly
CN301: SAN & PH 4P 80L (VN35590)
CN401: SAN & PH 3P 100L (VM85710)

TALKBACK MODULE CIRCUIT DIAGRAM (T/C1, T/C2, MON2)



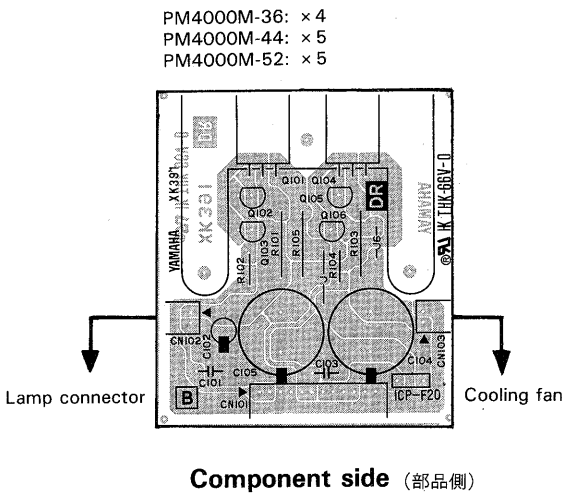
Notes:
 marked (F): Metal film resistor (1%)
 marked (P): Flame proof carbon resistor
 marked (C): Ceramic capacitor (pF)
 marked (M): Mylar capacitor (pF)

KEC-91965

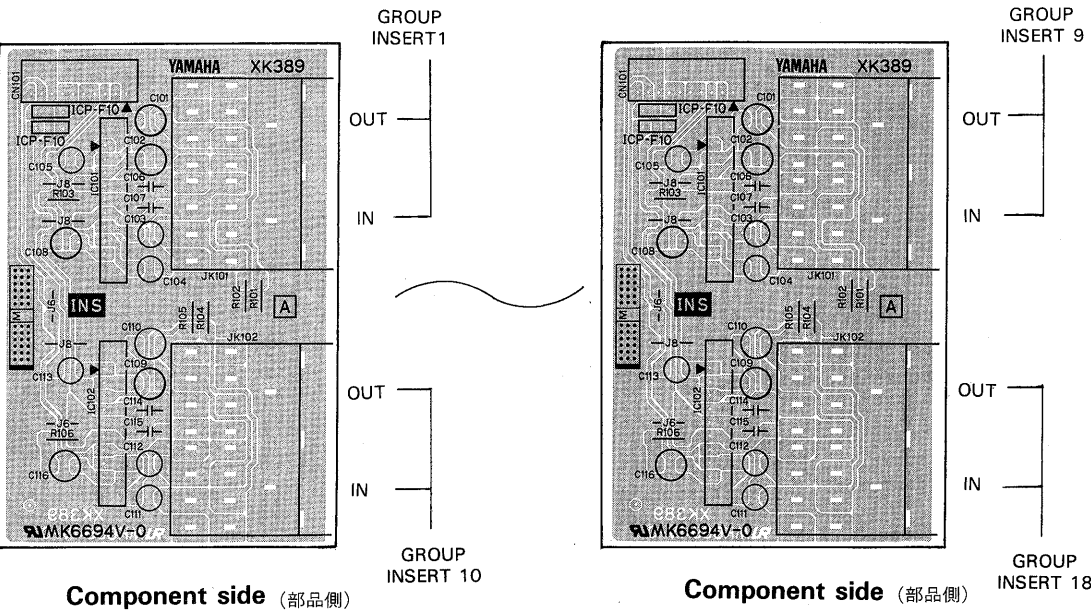
TALKBACK MODULE CIRCUIT DIAGRAM
 (T/C1, T/C2, MON2)

REAR PANEL (U) ASSEMBLY (CS, DR, EBI, INS, MF, MSL-C, MSL-L, VP)

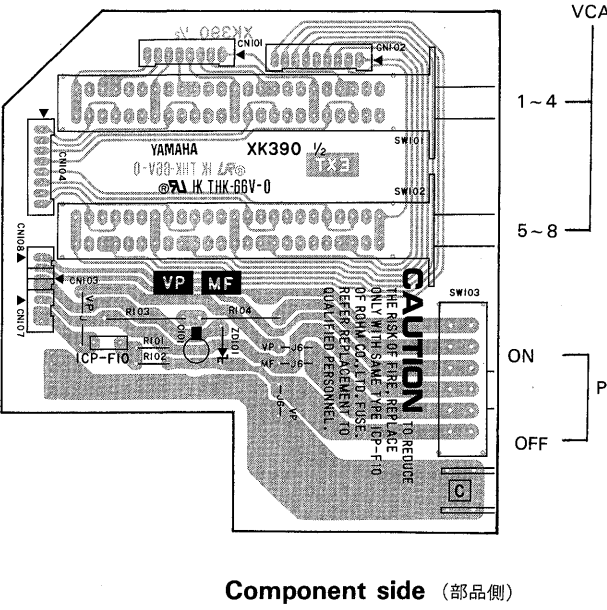
DR Circuit Board (DRIVER)



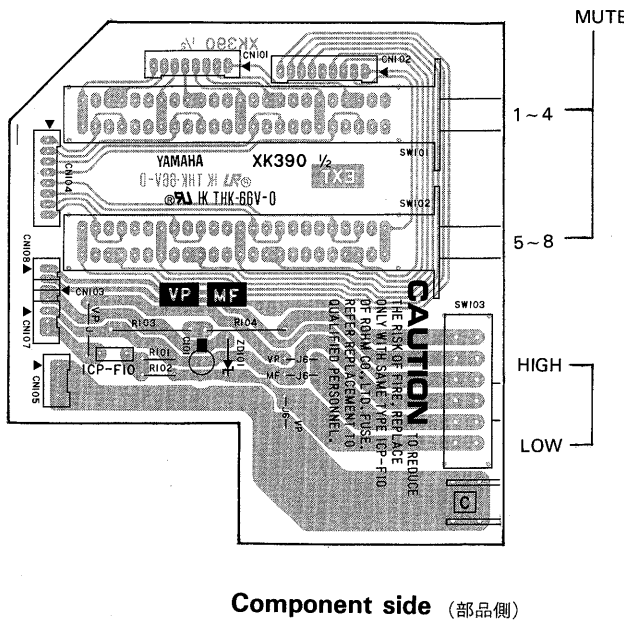
INS Circuit Board (×15) (INSERT)



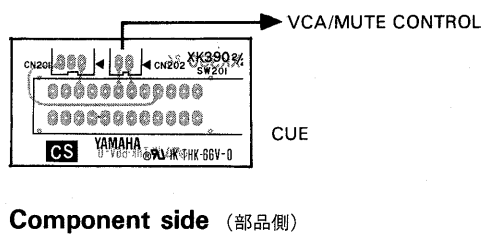
VP Circuit Board (VP1/2) (VCA & PHANTOM)



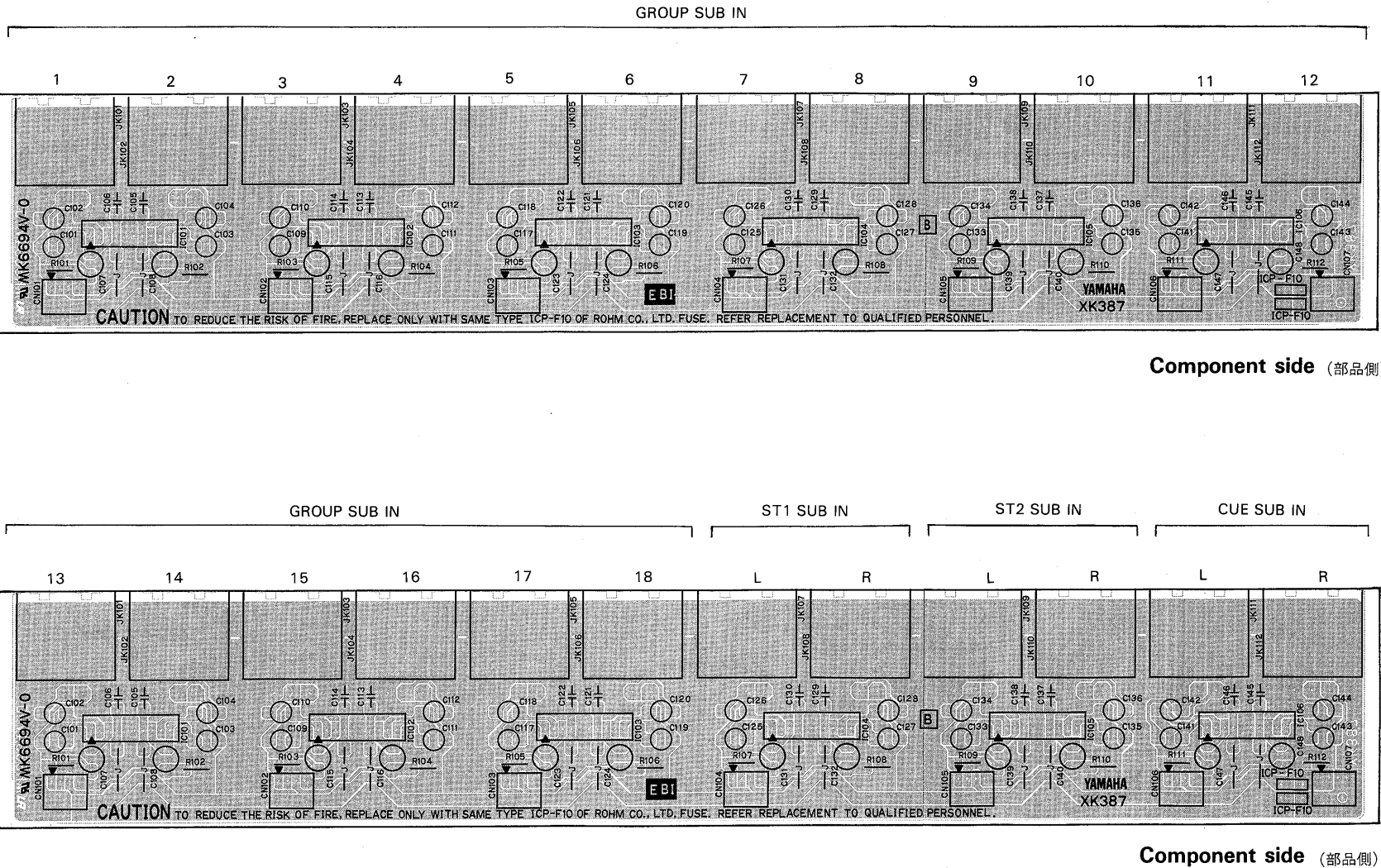
MF Circuit Board (MUTE & FAN)



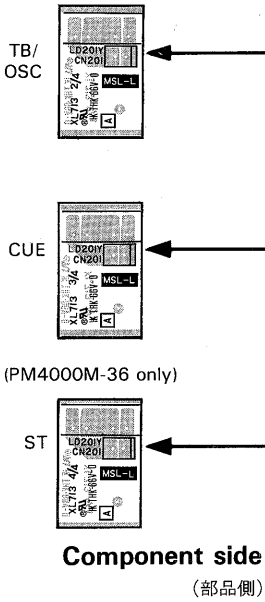
CS Circuit Board (VP2/2)



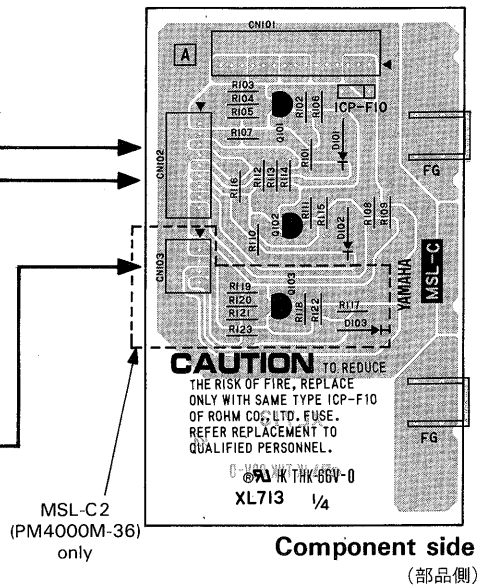
EBI Circuit Board (×2) (ELECTRIC BALANCE INPUT)



MSL-L1/MSL-L2 Circuit Board



MSL-C1/MSL-C2 Circuit Board

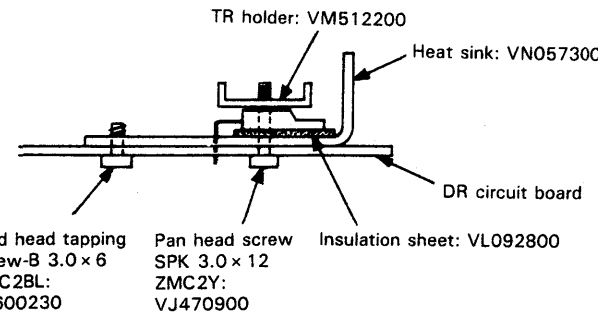


* MSL-L circuit boards are located on the METER panel.

- Notes
- Circuit Board: EBI (VN026400) XK387B0
- IC
IC101, IC102, IC103, IC104, IC105, IC106: 917038 (XK870A00) EBI
 - Ceramic Cap.
C105, C106, C113, C114, C121, C122, C129, C130, C137, C138, C145, C146: F 0.0100 50V Z (FG644100)
 - Electrolytic Cap.
C101, C102, C103, C104, C109, C110, C111, C112, C117, C118, C119, C120, C125, C126, C127, C128, C133, C134, C135, C136, C141, C142, C143, C144: BP 10.00 25.0V (UK547100)
C107, C108, C115, C116, C123, C124, C131, C132, C139, C140, C147, C148: BP-VP 47.00 25.0V (VN321100)
 - Carbon Resistor
R101, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111, R112: 100.0K 1/4 J (HF758100)
 - XLM Connector
JK101, JK102, JK103, JK104, JK105, JK106, JK107, JK108, JK109, JK110, JK111, JK112: XLM-3-31PCV (VL958600) GROUP SUB IN, ST1, ST2 SUB IN, CUE SUB IN
 - IC Protector
CP101, CP102: ICP-F10 (VF963600)
 - Base Post Connector
CN101, CN102, CN103, CN104, CN105, CN106, CN107: PH-4P SE (VB858300)

- Notes
- Circuit Board: DR (VN027100) XK391B0
- Transistor
Q101, Q104: 2SB596LBB O, Y (IB059600)
Q102, Q103, Q105, Q106: 2SC1815 Y, GR (IC1815M0)
 - Ceramic Cap.
C101, C103: F 0.0100 50V Z (FG644100)
 - Electrolytic Cap.
C102: 47.00 16.0V (UJ837470)
C104, C105: 4700 16.0V (UJ739470)
 - Carbon Resistor
R102, R104: 10.0K 1/4 J (HF757100)
 - Metal Oxide Film Resistor
R101: 1.5 1W J (VC740500)
R103, R105: 2.2 1W J (VC740900)
 - IC Protector
CP101: ICP-F20 (VG297000)
 - Base Post Connector
CN101, CN102, CN103: PH-12P SE (VC166500)
PH-2P SE (VB858100)

* Q101, 104 installing (DR circuit board)



- Notes
- Circuit Board: INS (VN026800) XK389A0
- IC
IC101, IC102: 911306 (XK872800) INS
 - Ceramic Cap.
C106, C107, C114, C115: F 0.0100 50V Z (FG644100)
 - Electrolytic Cap.
C101, C102, C108, C109, C110, C118, C103, C104, C105, C111, C112, C113: BP-VP 47.00 25.0V (VN321100)
BP 10.00 25.0V (UK547100)
 - Carbon Resistor
R101, R102, R103, R104, R105, R106: 100.0K 1/4 J (HF758100)
 - Phone Jack
JK101, JK102: 2P STEREO (VN327000) GROUP INSERT, ST1 IN, ST2 INSERT L, R
 - IC Protector
CP101, CP102: ICP-F10 (VF963600)
 - Base Post Connector
CN101: PH-10P SE (VB858900)
- Notes
- Circuit Board: MF (VN026900) XK390C0
- Zener Diode
D101: MTZ8.2C 8.2V (VA095400)
 - Electrolytic Cap.
C101: 10.00 16.0V (UJ837100)
 - Carbon Resistor
R101, R102: 680.0 1/4 J (HF75568)
 - Slide Switch
SW103: SSSB1 (VP958200) FAN SPEED HIGH/LOW
 - Rotary Switch
SW101, SW102: SRRZS8 8/3 (VN019000) MUTE SLAVE/OFF/MASTER 1-4, 5-8
 - IC Protector
CP101: ICP-F10 (VF963600)
 - Base Post Connector
CN101, CN104: PH-8P TE (VB390400)
CN102: PH-8P TE (VB390500)
CN103: PH-8P TE (VB390100)
CN105: PH-4P TE (VB390000)

- Notes
- Circuit Board: VP (VN027000) XK390C0
- Metal Oxide Film Resistor
R103: 2.7K 2W J (VC762500)
R104: 3.3K 2W J (VC762700)
 - Slide Switch
SW103: SSSB1 (VP958200) PHANTOM MASTER
 - Rotary Switch
SW101, SW102: SRRZS8 8/3 (VN019000) VCA SLAVE/OFF/MASTER 1-4, 5-8
SRRZS4 4/2 (VN900500) CUE OFF/CONNECT
 - Base Post Connector
CN101, CN104: PH-8P TE (VB390400)
CN102: PH-8P TE (VB390500)
CN103: PH-3P TE (VB389900)
CN108, CN202: PH-2P TE (VB389800)

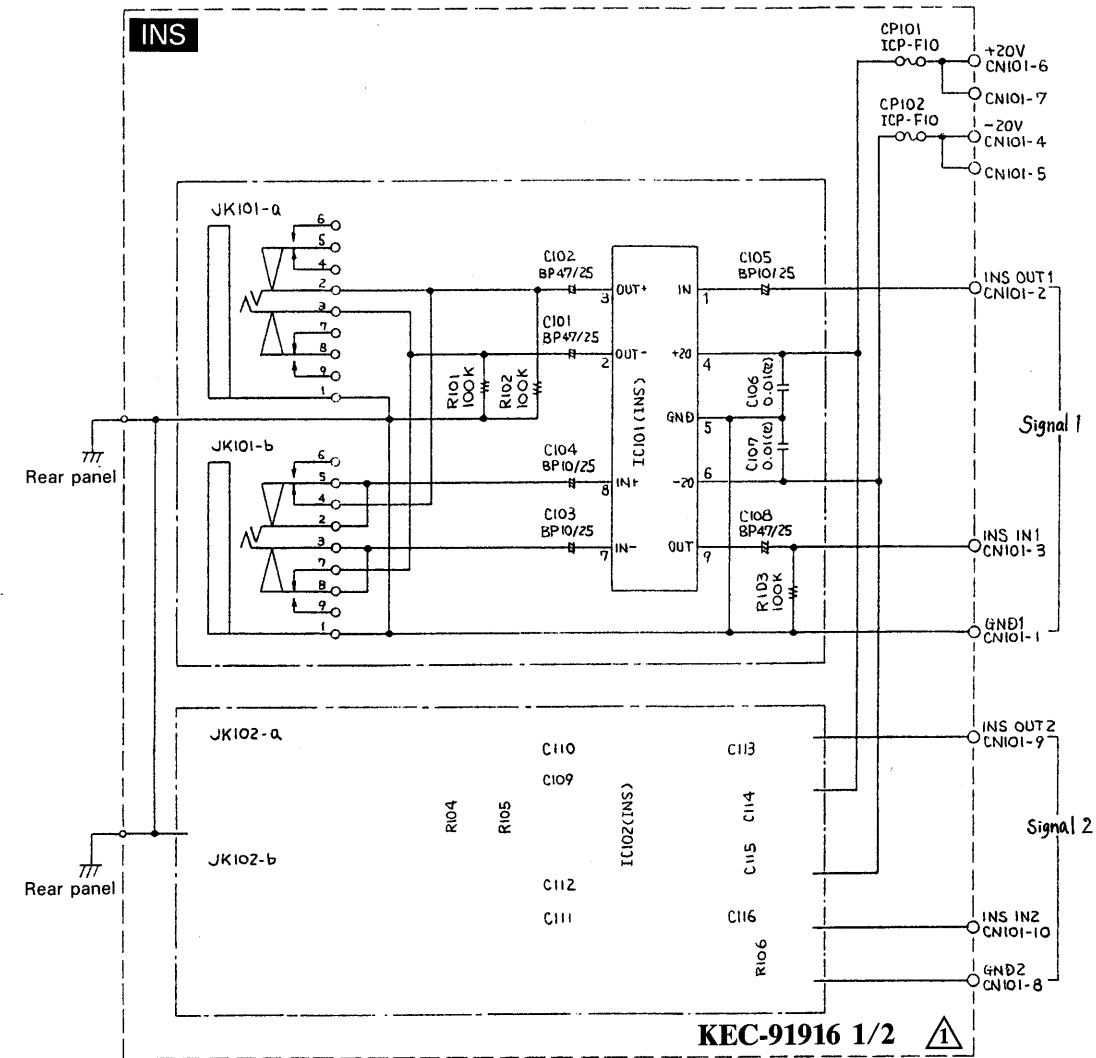
- Notes
- Circuit Board: MSL-L1 (VQ167100) XL713A0 (PM4000M-44/52)
- LED Display
LD201: LN0202YP4 (VA273600) TB OSC, CUE
 - Connector
CN201: SAN & PH 2P 60L (VM62900)
- Notes
- Circuit Board: MSL-L2 (VQ167200) XL713A0 (PM4000M-36)
- LED Display
LD201: LN0202YP4 (VA273600) TB/OSC, CUE, S T
 - Connector
CN201: SAN & PH 2P 60L (VM62900)
- Notes
- Circuit Board: MSL-C1 (VQ166900) XL713A0 (PM4000M-44/52)
- Transistor
Q101, Q102: 2SA1015 O, Y (IA101590)
 - Diode
D101, D102: 1SS133, 1SS176 (VB941200)
 - Carbon Resistor
R101, R110: 15.0K 1/4 J (HF757150)
R102, R111: 4.7K 1/4 J (HF756470)
R103, R104, R105, R112, R113: 1.2K 1/4 J (HF756120)
R106, R108, R115: 5.6K 1/4 J (HF756560)
R107, R109, R116: 12.0K 1/4 J (HF757120)
R114: 1.2K 1/4 J (HF756120)
 - IC Protector
CP101: ICP-F10 (VF963600)
 - Connector
CN101: PH-15P SE (VK015500)
CN102: PH-9P SE (VB858800)

- Notes
- Circuit Board: MSL-C2 (VQ167000) XL713A0 (PM4000M-36)
- Transistor
Q101, Q102, Q103: 2SA1015 O, Y (IA101590)
 - Diode
D101, D102, D103: 1SS133, 1SS176 (VB941200)
 - Carbon Resistor
R101, R110, R117: 15.0K 1/4 J (HF757150)
R102, R111, R118: 4.7K 1/4 J (HF756470)
R103, R104, R105, R112, R113, R119, R120, R121: 1.2K 1/4 J (HF756120)
R106, R108, R115: 5.6K 1/4 J (HF756560)
R107, R109, R116, R123: 12.0K 1/4 J (HF757120)
R114: 1.2K 1/4 J (HF756120)
 - IC Protector
CP101: ICP-F10 (VF963600)
 - Connector
CN101: PH-15P SE (VK015500)
CN102: PH-9P SE (VB858800)
CN103: PH-4P SE (VB858300)

- 3NA-VN02710 : DR
3NA-VN02680 : INS
3NA-VN02700 : VP, CS
3NA-VN02690 : MF
3NA-VN02640 : EBI
3NA-VP50860 : MSL-C1, MSL-L1
3NA-VQ16540 : MSL-C2, MSL-L2

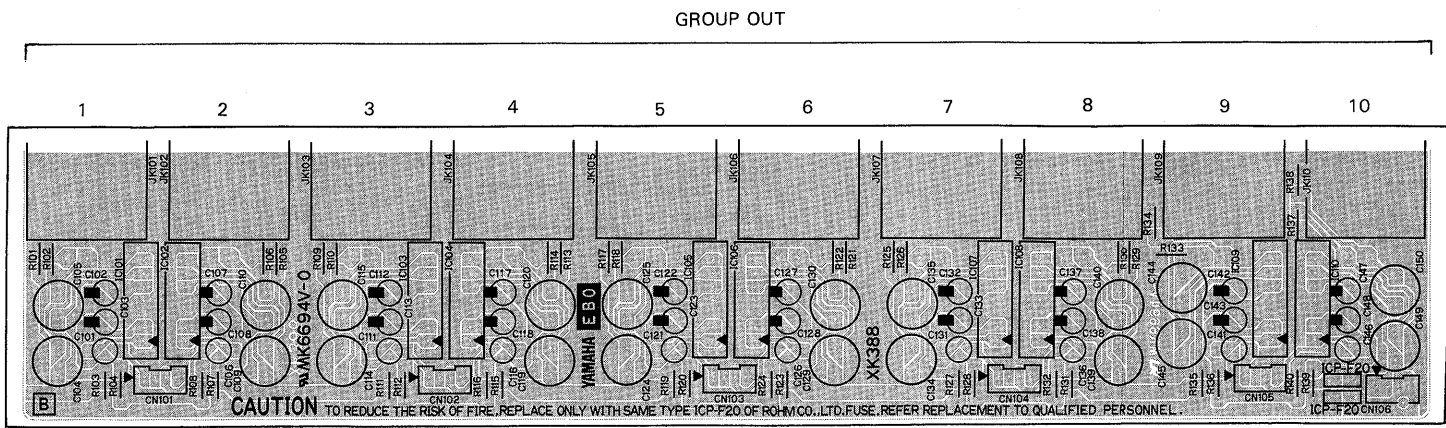
REAR PANEL (U) ASSEMBLY CIRCUIT DIAGRAM (CS, DR, EBI, INS, MF, MSL-C, MSL-L, VP)

PM4000M/PW4000

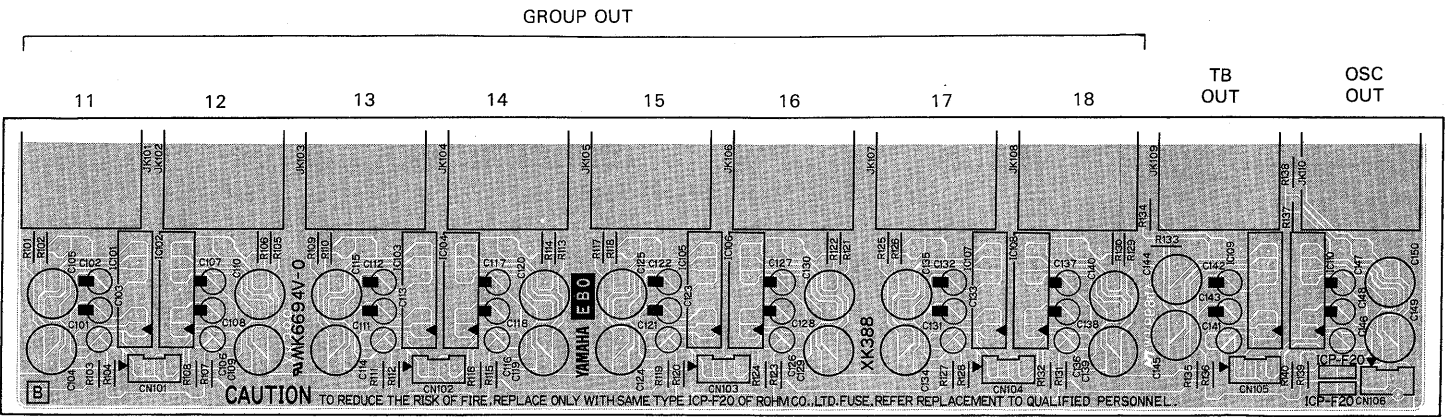


REAR (MAS) ASSEMBLY (CO,EBO)

EBO10 Circuit Board
(ELECTRIC BALANCED OUTPUT)

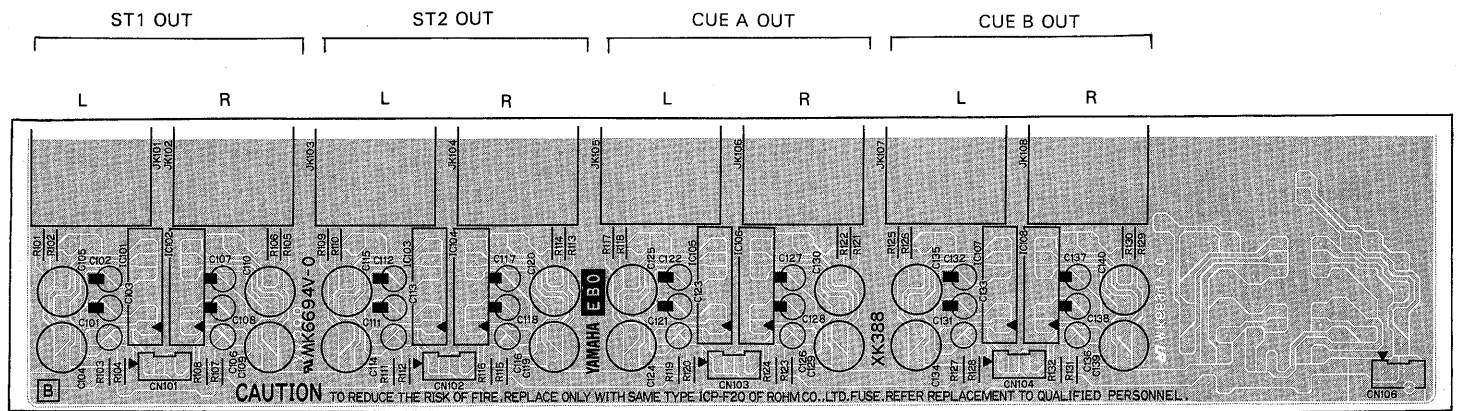


Component side (部品側)



Component side (部品側)

EBO8 Circuit Board



Component side (部品側)

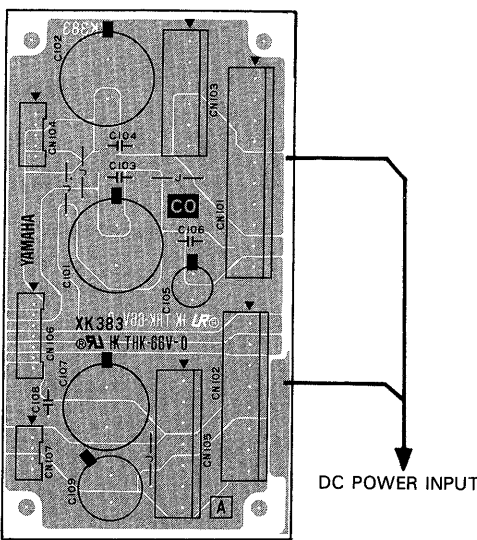
Notes)

- Circuit Board: EBO10 (VN026600) XK388B0
- IC
IC101, IC102, IC103,
IC104, IC105, IC106,
IC107, IC108, IC109,
IC110:
917040 (XK871A00) EBO
 - Electrolytic Cap.
C101, C106, C111,
C116, C121, C126,
C131, C136, C141,
C146:
BP 10.00 25.0V (UK547100)
C102, C103, C107,
C108, C112, C113,
C117, C118, C122,
C123, C127, C128,
C132, C133, C137,
C138, C142, C143,
C147, C148:
10.00 25.0V (UJ847100)
C104, C105, C109,
C110, C114, C115,
C119, C120, C124,
C125, C129, C130,
C134, C135, C139,
C140, C144, C145,
C149, C150:
BP-VP 220.00 25.0V (VL049300)
 - Carbon Resistor
R101, R102, R105,
R106, R109, R110,
R113, R114, R117,
R118, R121, R122,
R125, R126, R129,
R130, R133, R134,
R137, R138:
22.0K 1/4 J (HF757220)
 - Flame Proof C. Resistor
R103, R104, R107,
R108, R111, R112,
R115, R116, R119,
R120, R123, R124,
R127, R128, R131,
R132, R135, R136,
R139, R140:
10.0 1/4 J (HV754100)
 - XLM Connector
JK101, JK102, JK103,
JK104, JK105, JK106,
JK107, JK108, JK109,
JK110:
XLM-3-32PCV (VL958700) GROUP OUT1-18, TB
OUT, OSC OUT
 - IC Protector
CP101, CP102:
ICP-F20 (VG297000)
 - Base Post Connector
CN101, CN102, CN103,
CN104, CN105, CN106: PH-4P TE (VB390000)

Notes)

- Circuit Board: EBO8 (VN026700) XK388B0
- IC
IC101, IC102, IC103,
IC104, IC105, IC106,
IC107, IC108:
917040 (XK871A00) EBO
 - Electrolytic Cap.
C101, C106, C111,
C116, C121, C126,
C131, C136:
BP 10.00 25.0V (UK547100)
C102, C103, C107,
C108, C112, C113,
C117, C118, C122,
C123, C127, C128,
C132, C133, C137,
C138:
10.00 25.0V (UJ847100)
C104, C105, C109,
C110, C114, C115,
C119, C120, C124,
C125, C129, C130,
C134, C135, C139,
C140:
BP-VP 220.00 25.0V (VL049300)
 - Carbon Resistor
R101, R102, R105,
R106, R109, R110,
R113, R114, R117,
R118, R121, R122,
R125, R126, R129,
R130:
22.0K 1/4 J (HF757220)
 - Flame Proof C. Resistor
R103, R104, R107,
R108, R111, R112,
R115, R116, R119,
R120, R123, R124,
R127, R128, R131,
R132:
10.0 1/4 J (HV754100)
 - XLM Connector
JK101, JK102, JK103,
JK104, JK105, JK106,
JK107, JK108:
XLM-3-32PCV (VL958700) ST1, ST2 OUT, CUE
A, CUE B OUT
 - IC Protector
CP101, CP102:
ICP-F20 (VG297000)
 - Base Post Connector
CN101, CN102, CN103,
CN104, CN106:
PH-4P TE (VB390000)

CO Circuit Board
(CONDENSER)



Component side (部品側)

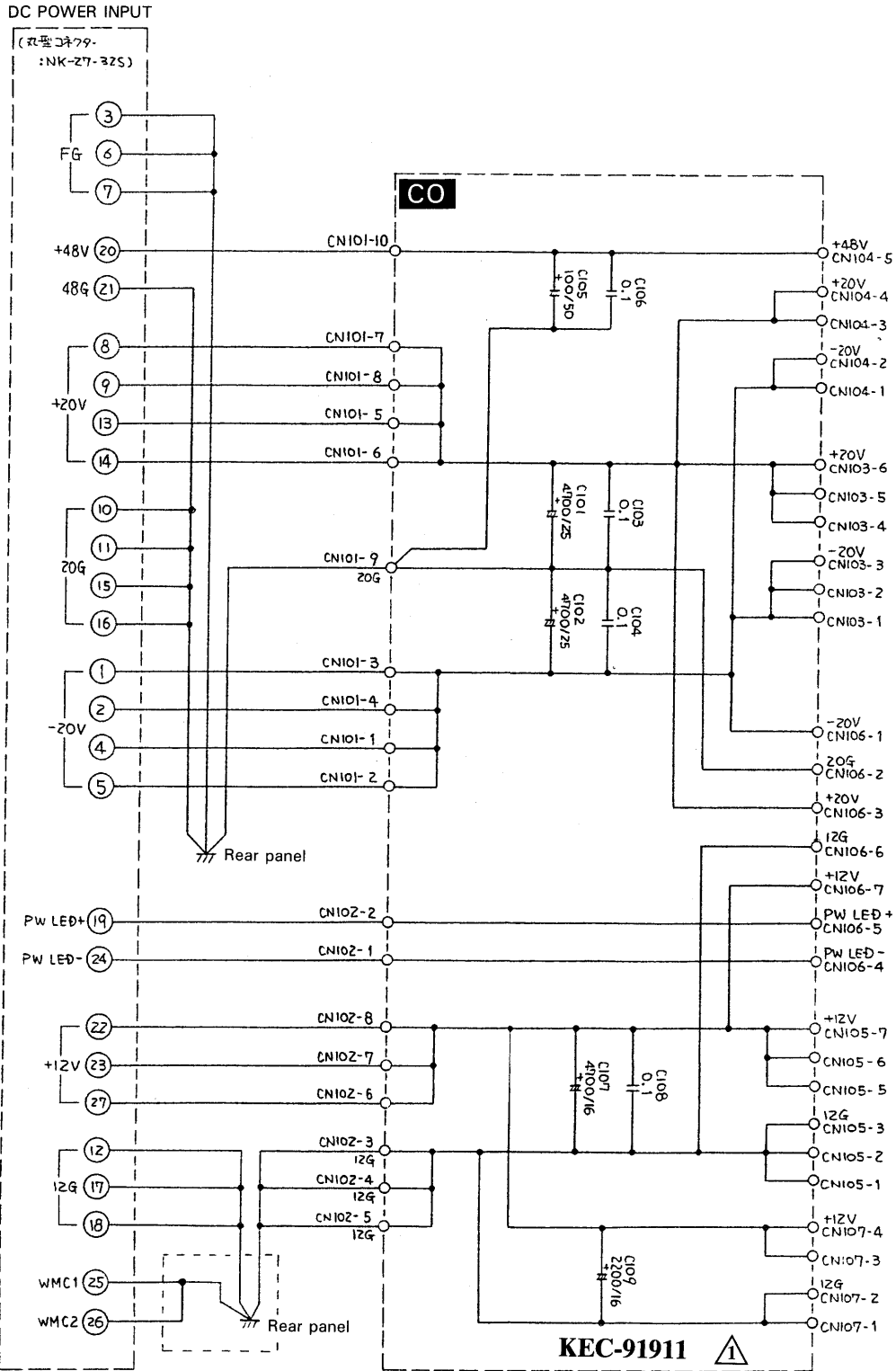
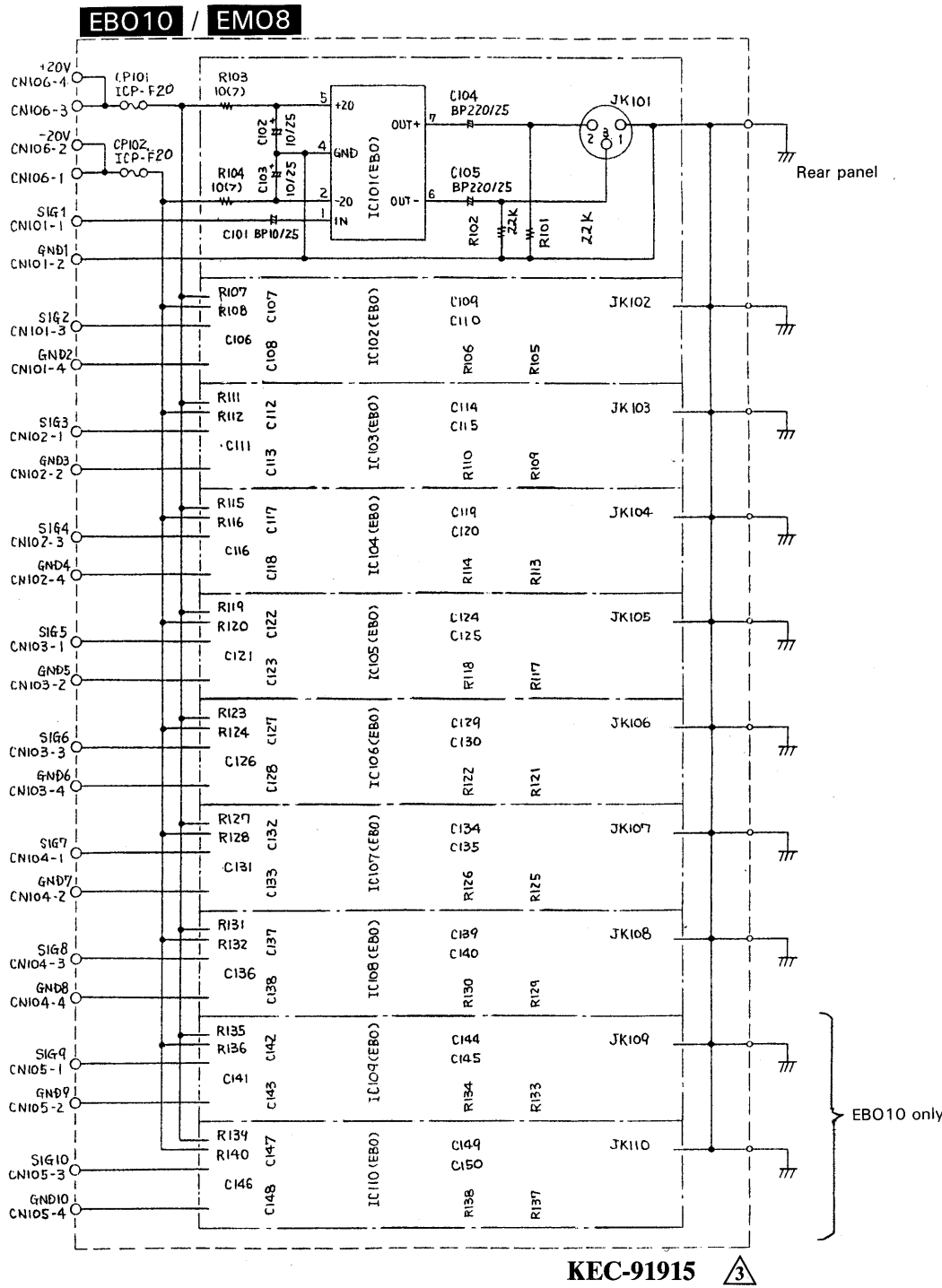
Notes)

- Circuit Board: CO (VN026200) XK383A0
- Mylar Cap.
C103, C104, C106,
C108:
0.1000 50V J (UA255100)
 - Electrolytic Cap.
C101, C102:
4700 25.0V (UJ749470)
C105:
100.00 50.0V (UJ768100)
C107:
4700 16.0V (UJ739470)
C109:
2200 16.0V (UJ739220)
 - Base Post Connector
CN101:
VH-10P TE (LB932100)
CN102:
VH-8P TE (LB932080)
CN103:
VH-6P TE (LB932060)
CN104:
PH-5P TE (VB390100)
CN105:
VH-7P TE (LB932070)
CN106:
PH-7P TE (VB390300)
CN107:
PH-4P TE (VB390000)

3NA-VN02660 △ : EBO10, EBO8
3NA-VN02620 △ : CO

REAR (MAS) ASSEMBLY CIRCUIT DIAGRAM (CO,EBO)

Connector	Pin	Name	No.		
			1 (EBO10)	2 (EBO10)	3 (EBO8)
CN101	1	SIG 1	GROUP OUT 1	GROUP OUT 11	ST1 OUT L
	2	GND 1	GROUP OUT (GND)	GROUP OUT (GND)	ST1 OUT (NC)
	3	SIG 2	GROUP OUT 2	GROUP OUT 12	ST1 OUT R
	4	GND 2	GROUP OUT (GND)	GROUP OUT (GND)	ST1 OUT (GND)
CN102	1	SIG 3	GROUP OUT 3	GROUP OUT 13	ST2 OUT L
	2	GND 3	GROUP OUT (GND)	GROUP OUT (GND)	ST2 OUT (NC)
	3	SIG 4	GROUP OUT 4	GROUP OUT 14	ST2 OUT R
	4	GND 4	GROUP OUT (GND)	GROUP OUT (GND)	ST2 OUT (GND)
CN103	1	SIG 5	GROUP OUT 5	GROUP OUT 15	CUE A OUT L
	2	GND 5	GROUP OUT (GND)	GROUP OUT (GND)	CUE A OUT (NC)
	3	SIG 6	GROUP OUT 6	GROUP OUT 16	CUE A OUT R
	4	GND 6	GROUP OUT (GND)	GROUP OUT (GND)	CUE A OUT (GND)
CN104	1	SIG 7	GROUP OUT 7	GROUP OUT 17	CUE B OUT L
	2	GND 7	GROUP OUT (GND)	GROUP OUT (GND)	CUE B OUT (NC)
	3	SIG 8	GROUP OUT 8	GROUP OUT 18	CUE B OUT R
	4	GND 8	GROUP OUT (GND)	GROUP OUT (GND)	CUE B OUT (GND)
CN105	1	SIG 9	GROUP OUT 9	TB OUT	
	2	GND 9	GROUP OUT (GND)	TB OUT (GND)	
	3	SIG 10	GROUP OUT 10	OSC OUT	
	4	GND 10	GROUP OUT (GND)	OSC OUT (GND)	

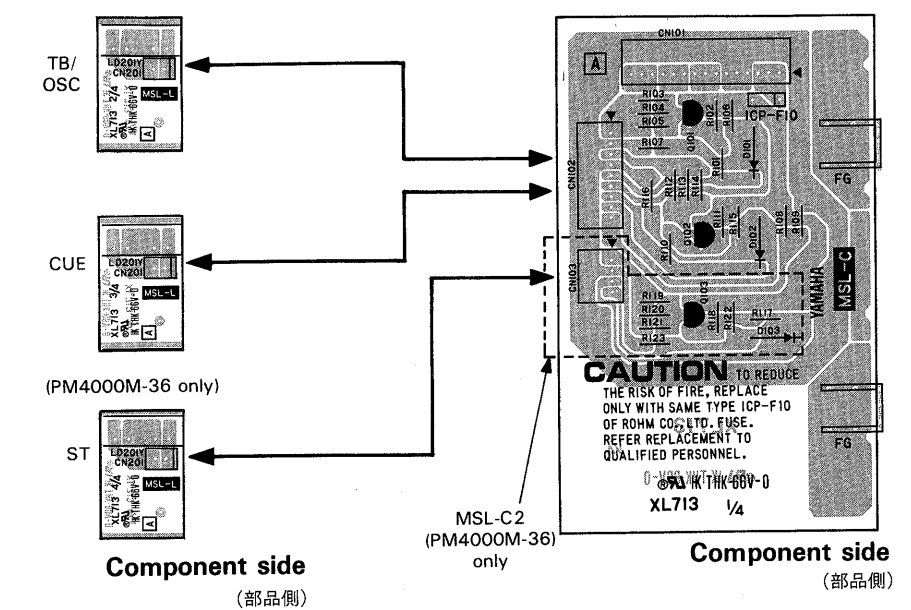
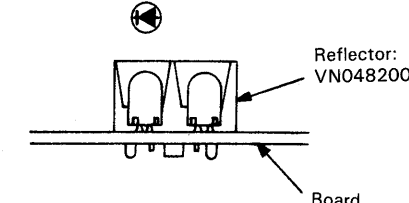
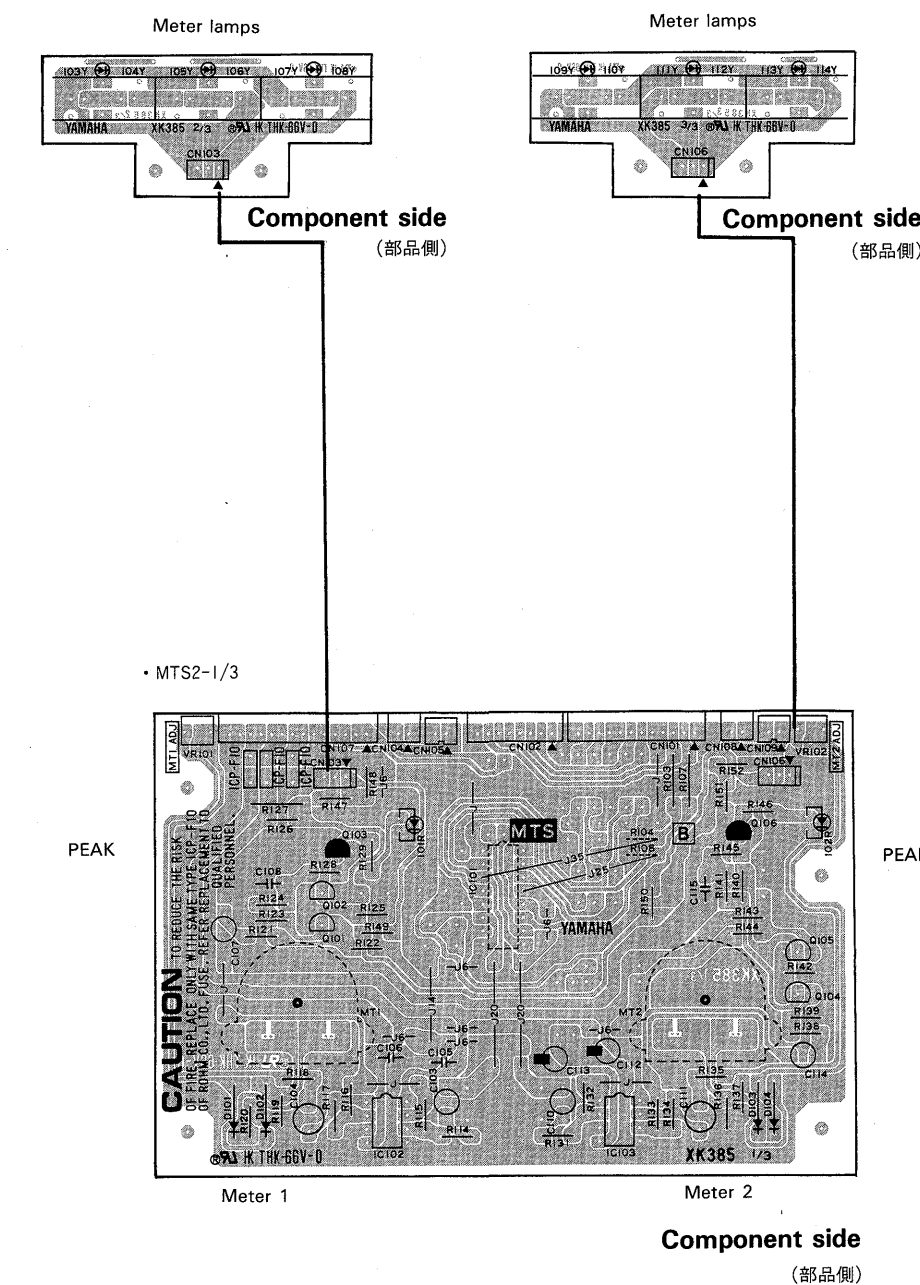


REAR (MAS) ASSEMBLY CIRCUIT DIAGRAM (CO,EBO)

■ **METER ASSEMBLY** (PI, MTS1, MTS2, MSL-L, MSL-C) PM4000M/PW4000

● MSL-C Circuit Board

- MTS2-3/3



* MSL-C circuit board is located on the REAR PANEL (U) ASSEMBLY.

3NA-VN02720 $\triangle_3$: PI
 3NA-VN02740 $\triangle_2$: MTS1
 3NA-VP50890 $\triangle_2$: MTS2
 3NA-VP50860 : MSL-C, MSL-L

Notes)

- Circuit Board: PI (VN027200) XK374C0
- LED
D101, D102, D104: SLP-255B-81 GR (VN327400) +20, -20, +12
D103: GL9EH2 OR/GR (VQ320800) +48
D105: SLP-155B-81 RE (VN327300) CAUTION
 - Ceramic Cap.
C101: F 0.0100 50V Z (FG444100)
 - Carbon Resistor
R104: 1.5K 1/4 J (HF756150)
 - Metal Oxide Film Resistor
R101, R102: 1.2K 2W J (VC761600)
R103: 680.0 1W J (VC747000)
R105: 1.8K 1W J (VC748200)
 - Variable Resistor
VR101: B5K & DMY DMY*2 (VP128200) LAMP DIMMER
 - IC Protector
CP101, CP102, CP103: ICP-F10 (VF963600)
 - Base Post Connector
CN101: PH-10P SE (VB858900)

Notes)

- Circuit Board: MTS1 (VN027400) XK385B0
- IC
IC101: TC4052BP (XA053A00) MULTIPLEXER
IC102, IC103: NJM2041D-D (IG069200) OP AMP
 - Transistor
Q101, Q102, Q104, Q105: 2SC1815 Y, GR (IC1815M0)
Q103, Q106: 2SA1015 O, Y (IA101590)
 - Diode
D101, D102, D103, D104: 1K34A (VN320100)
 - LED
LD101, LD102: GL2PR6 RE (VH325200) PEAK
LD103, LD104, LD105, LD106, LD107, LD108, LD109, LD110, LD111, LD112, LD113, LD114: GL5HY40 YE (VP155700) Meter lamp
 - Mylar Cap.
C108, C115: 0.0470 50V J (UA354470)
 - Ceramic Cap.
C105, C106: F 0.0100 50V Z (FG644100)
 - Electrolytic Cap.
C101, C102: 10.00 16.0V (UJ837100)
C103, C110: BP 10.00 25.0V (UK547100)
C104, C111: BP-VP 47.00 25.0V (VN321100)
C107, C114: BP 1.00 50.0V (UK866100)
C112, C113: 10.00 25.0V (UJ847100)
 - Carbon Resistor
R101, R103, R105, R107, R122, R123, R139, R140, R153, R155: 47.0K 1/4 J (HF757470)
R102, R104, R106, R108, R117, R134, R154, R156: 18.0K 1/4 J (HF757180)
R109, R112: 5.6K 1/4 J (HF756560)
R110, R111, R124, R141: 4.7K 1/4 J (HF756470)
R113, R130: 68.0K 1/4 J (HF757680)
R114, R131: 8.2K 1/4 J (HF756820)
R115, R132: 82.0K 1/4 J (HF757820)
R116, R133: 11.0K 1/4 J (HF757110)
R147, R148, R149, R150, R151, R152: 100.0 1/4 J (HF755100)
R118, R135: 470.0 1/4 J (HF755470)
R121, R128, R138, R145: 100.0K 1/4 J (HF758100)
R125, R142: 1.0K 1/4 J (HF756100)
R119, R120, R129, R136, R137, R146: 1.6K 1/4 J (HF756160)
R126, R143: 20.0K 1/4 J (HF757200)
R127, R144: 30.0K 1/4 J (HF757300)
 - Trimmer Potentiometer
R101, R102: B1.0K (VA785900) Meter adj.
 - C Protector
CP101, CP102, CP103: ICP-F10 (VF963600)
 - Connector
CN101: PH-12P SE (VC166500)
CN102: PH-8P SE (VB858700)
CN103, CN106: SAN & SAN-3P 60L (VN900600)
CN104, CN108: PH-2P SE (VB858100)
CN105, CN109: PH-2P TE (VB389800)
CN107: PH-14P SE (VH904200)

Notes)

- Circuit Board: MTS2 (VP508900) XK385B0
- IC
IC102, IC103: NJM2041D-D (IG069200) OP AMP
 - Transistor
Q101, Q102, Q104, Q105: 2SC1815 Y, GR (IC1815M0)
Q103, Q106: 2SA1015 O, Y (IA101590)
 - Diode
D101, D102, D103, D104: 1K34A (VN320100)
 - LED
LD101, LD102: GL2PR6 RE (VH325200) PEAK
LD103, LD104, LD105, LD106, LD107, LD108, LD109, LD110, LD111, LD112, LD113, LD114: GL5HY40 YE (VP155700) Meter lamp
 - Mylar Cap.
C108, C115: 0.0470 50V J (UA354470) meter adj.
 - Ceramic Cap.
C105, C106: F 0.0100 50V Z (FG644100)
 - Electrolytic Cap.
C103, C110: BP 10.00 25.0V (UK547100)
C104, C111: BP-VP 47.00 25.0V (VN321100)
C107, C114: BP 1.00 50.0V (UK866100)
C112, C113: 10.00 25.0V (UJ847100)
 - Carbon Resistor
R114, R115, R122, R123, R131, R132, R139, R140: 47.0K 1/4 J (HF757470)
R116, R133: 11.0K 1/4 J (HF757110)
R117, R134: 18.0K 1/4 J (HF757180)
R118, R135: 470.0 1/4 J (HF755470)
R119, R120, R129, R136, R137, R146: 1.6K 1/4 J (HF756160)
R121, R128, R138, R145: 100.0K 1/4 J (HF758100)
R124, R141: 4.7K 1/4 J (HF756470)
R125, R142: 1.0K 1/4 J (HF756100)
R126, R143: 20.0K 1/4 J (HF757200)
R127, R144: 30.0K 1/4 J (HF757300)
R147, R148, R149, R150, R151, R152: 100.0 1/4 J (HF755100)
 - Trimmer Potentiometer
VR101, VR102: B1.0K (VA785900)
 - IC Protector
CP101, CP102, CP103: ICP-F10 (VF963600)
 - Connector
CN101: PH-4P SE (VB858300)
CN103, CN106: SAN&SAN-3P 60L (VN900600)
CN107: PH-14P SE (VH904200)
CN: MTS2 (VQ52660)

Notes)

- Circuit Board: MSL-L1 (VQ167100) XL713A0 (PM4000M-44/52)
1. LED Display
LD201: LN0202YP4 (VA273600) TB OSC,CUE
 2. Connector
CN201: SAN & PH 2P 60L (VM62900)

Notes)

- Circuit Board: MSL-L2 (VQ167200) XL713A0 (PM4000M-36)
1. LED Display
LD201: LN0202YP4 (VA273600) TB/OSC, CUE,S T
 2. Connector
CN201: SAN & PH 2P 60L (VM62900)

Notes)

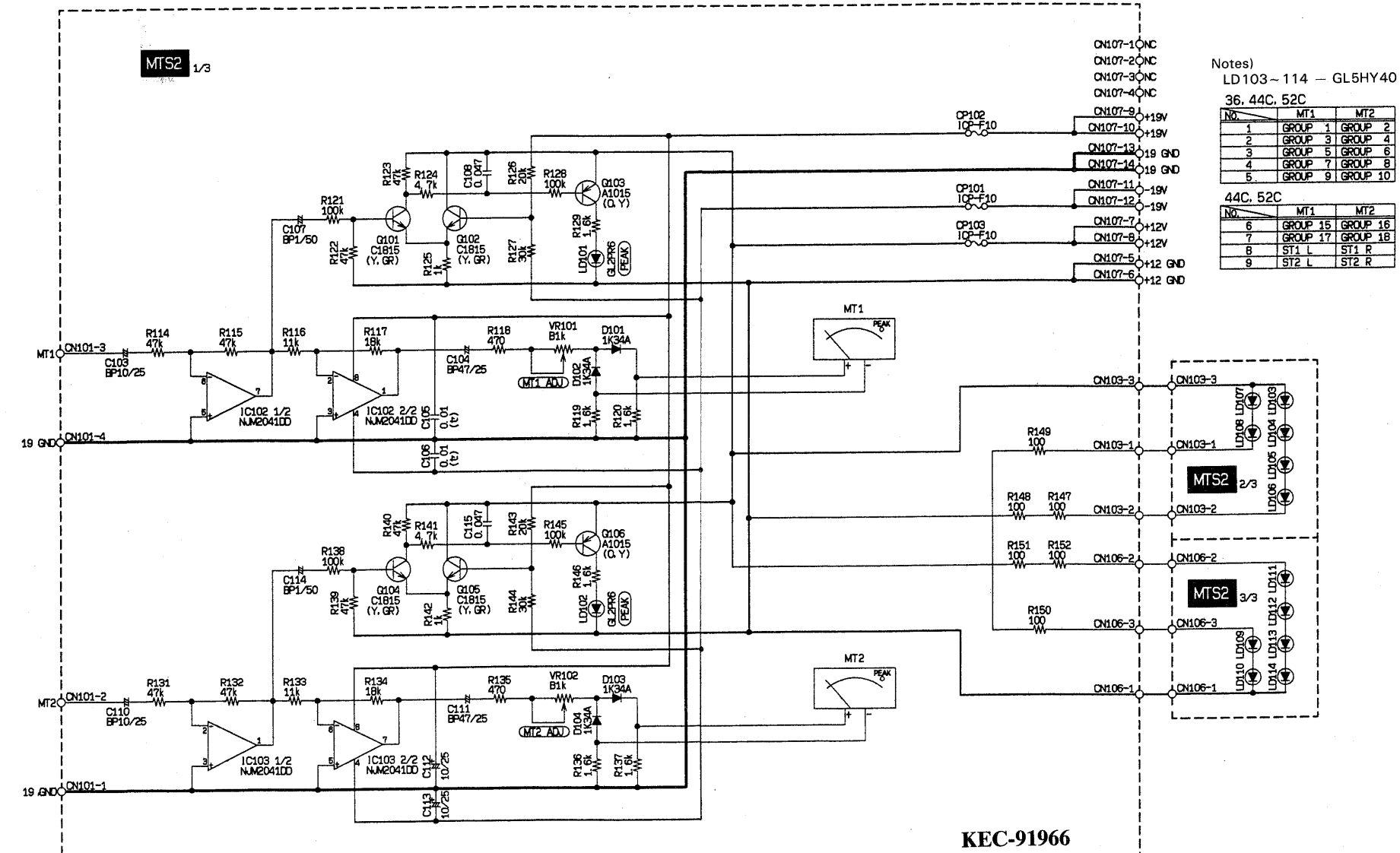
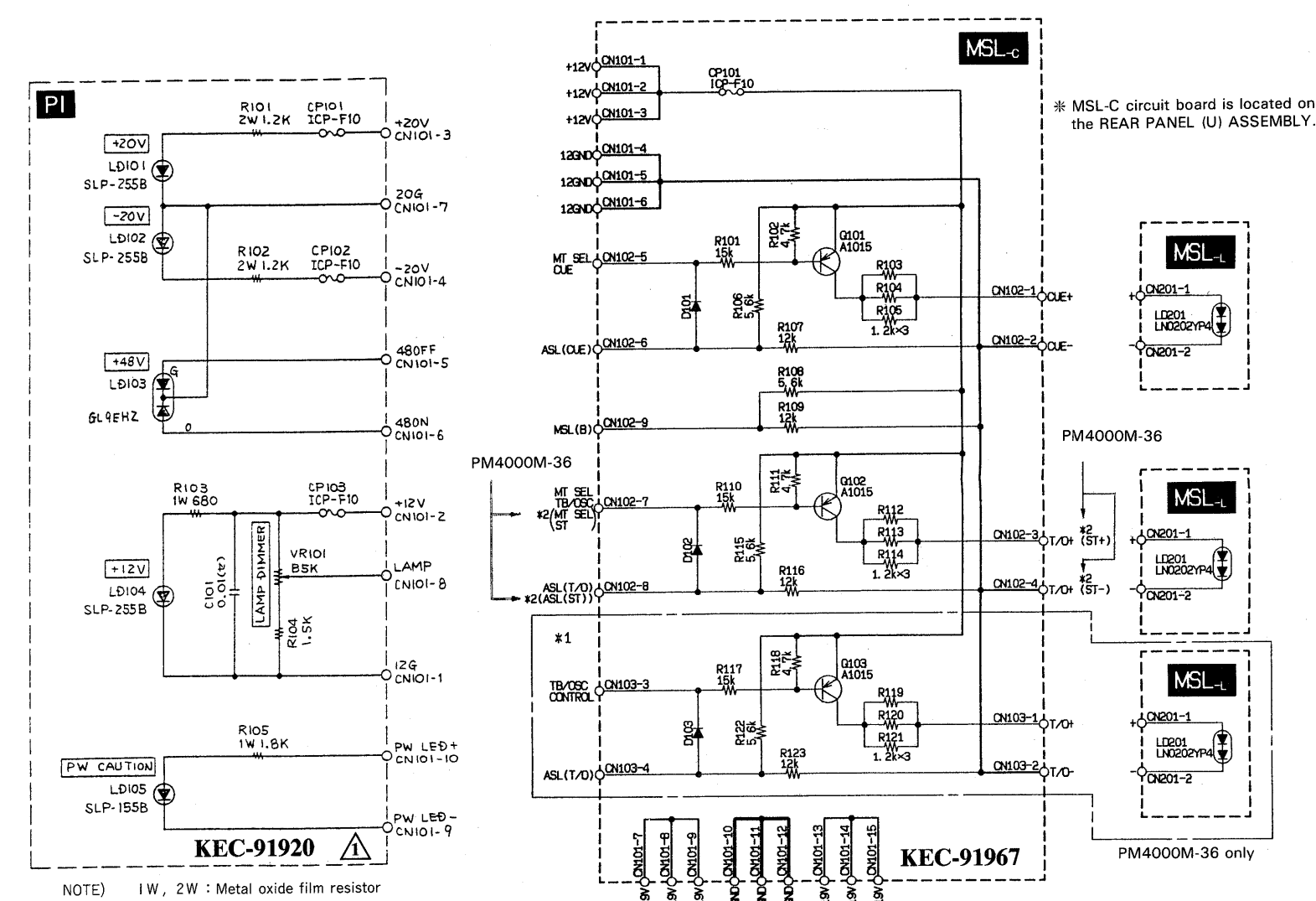
- Circuit Board: MSL-C1 (VQ166900) XL713A0 (PM4000M-44/52)
1. Transistor
Q101, Q102: 2SA1015 O, Y (IA101590)
 2. Diode
D101, D102: 1SS133, 1SS176 (VB941200)
 3. Carbon Resistor
R101, R110: 15.0K 1/4 J (HF757150)
R102, R111: 4.7K 1/4 J (HF756470)
R103, R104, R105, R112, R113: 1.2K 1/4 J (HF756120)
R106, R108, R115: 5.6K 1/4 J (HF756560)
R107, R109, R116: 12.0K 1/4 J (HF75712)
R114: 1.2K 1/4 J (HF756120)
 4. IC Protector
CP101: ICP-F10 (VF963600)
 5. Connector
CN101: PH-15P SE (VK015500)
CN102: PH-9P SE (VB858800)

Notes)

- Circuit Board: MSL-C2 (VQ167000) XL713A0 (PM4000M-36)
1. Transistor
Q101, Q102, Q103: 2SA1015 O, Y (IA101590)
 2. Diode
D101, D102, D103: 1SS133, 1SS176 (VB941200)
 3. Carbon Resistor
R101, R110, R117: 15.0K 1/4 J (HF757150)
R102, R111, R118: 4.7K 1/4 J (HF756470)
R103, R104, R105, R112, R113, R119, R120, R121: 1.2K 1/4 J (HF756120)
R106, R108, R115: 5.6K 1/4 J (HF756560)
R107, R109, R116, R123: 12.0K 1/4 J (HF75712)
R114: 1.2K 1/4 J (HF756120)
 4. IC Protector
CP101: ICP-F10 (VF963600)
 5. Connector
CN101: PH-15P SE (VK015500)
CN102: PH-9P SE (VB858800)
CN103: PH-4P SE (VB858300)

METER ASSEMBLY CIRCUIT DIAGRAM 1/2 (PI, MTS1, MTS2, MSL-C, MSL-L)

PM4000M/PW4000



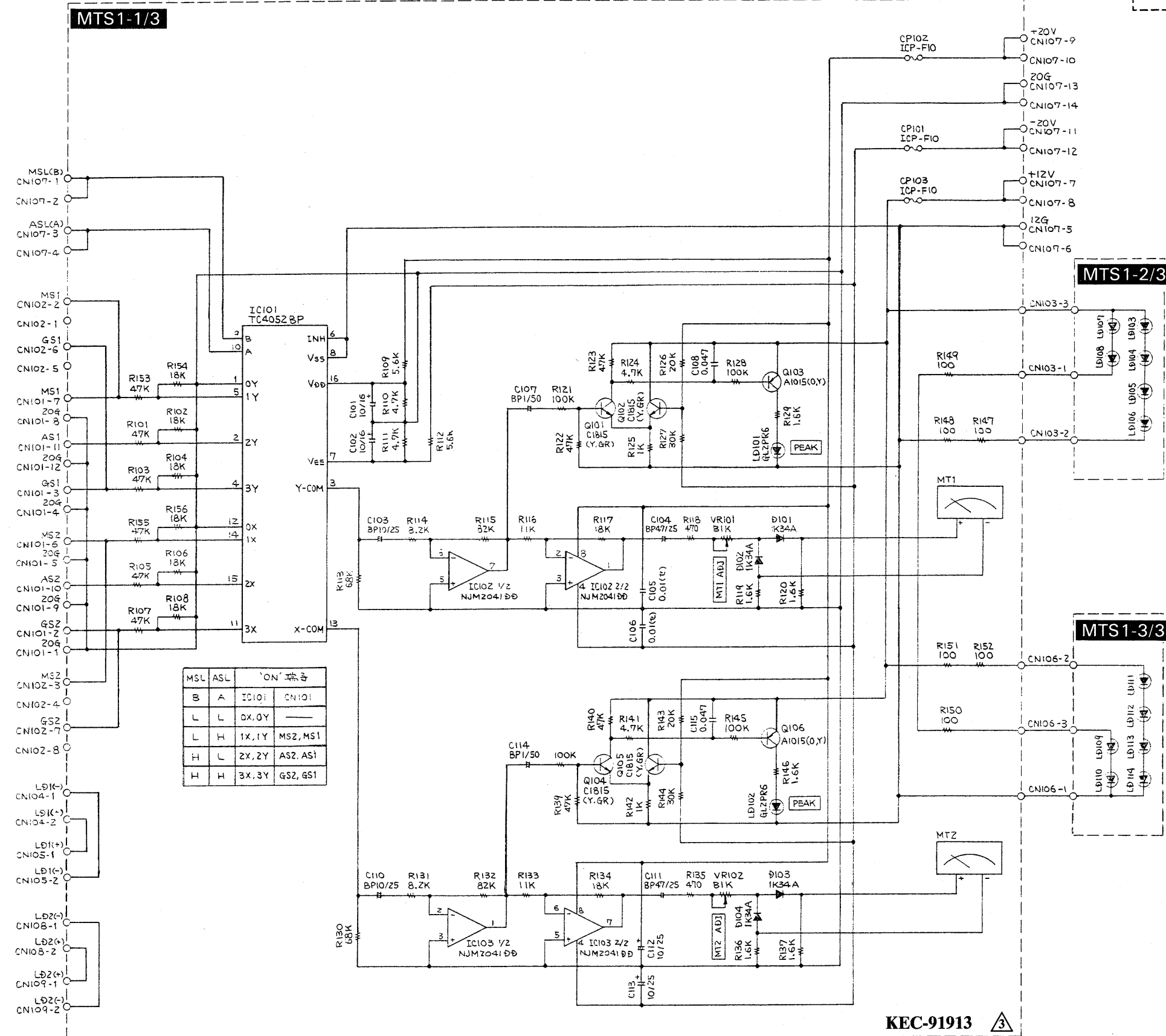
Notes)
LD103-114 : GL5HY40

36, 44C, 52C

No.	MT1	MT2
1	GROUP 1	GROUP 2
2	GROUP 3	GROUP 4
3	GROUP 5	GROUP 6
4	GROUP 7	GROUP 8
5	GROUP 9	GROUP 10

44C, 52C

No.	MT1	MT2
6	GROUP 15	GROUP 16
7	GROUP 17	GROUP 18
8	ST1 L	ST1 R
9	ST2 L	ST2 R



36, 44C, 52C

No.	MT1			MT2		
	GS1	MS1	AS1	GS2	MS2	AS2
1	GROUP 11	—	TB	GROUP 12	—	OSC
2	GROUP 13	—	CUE L	GROUP 14	—	CUE R

36

No.	MT1			MT2		
	GS1	MS1	AS1	GS2	MS2	AS2
3	GROUP 15	—	ST1 L	GROUP 16	—	ST1 R
4	GROUP 17	—	ST2 L	GROUP 18	—	ST2 R

NOTE) LD103-114: GL5HY40

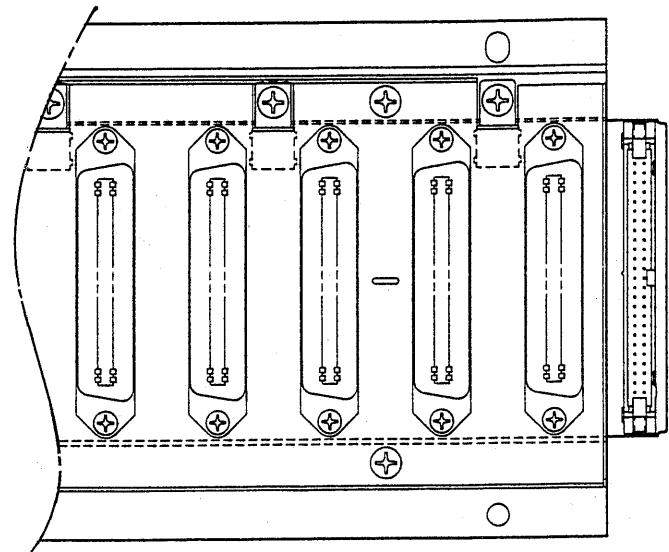
METER ASSEMBLY CIRCUIT DIAGRAM (PI, MTS1, MTS2, MSL-C, MSL-L)

PM4000M/PW4000 C23

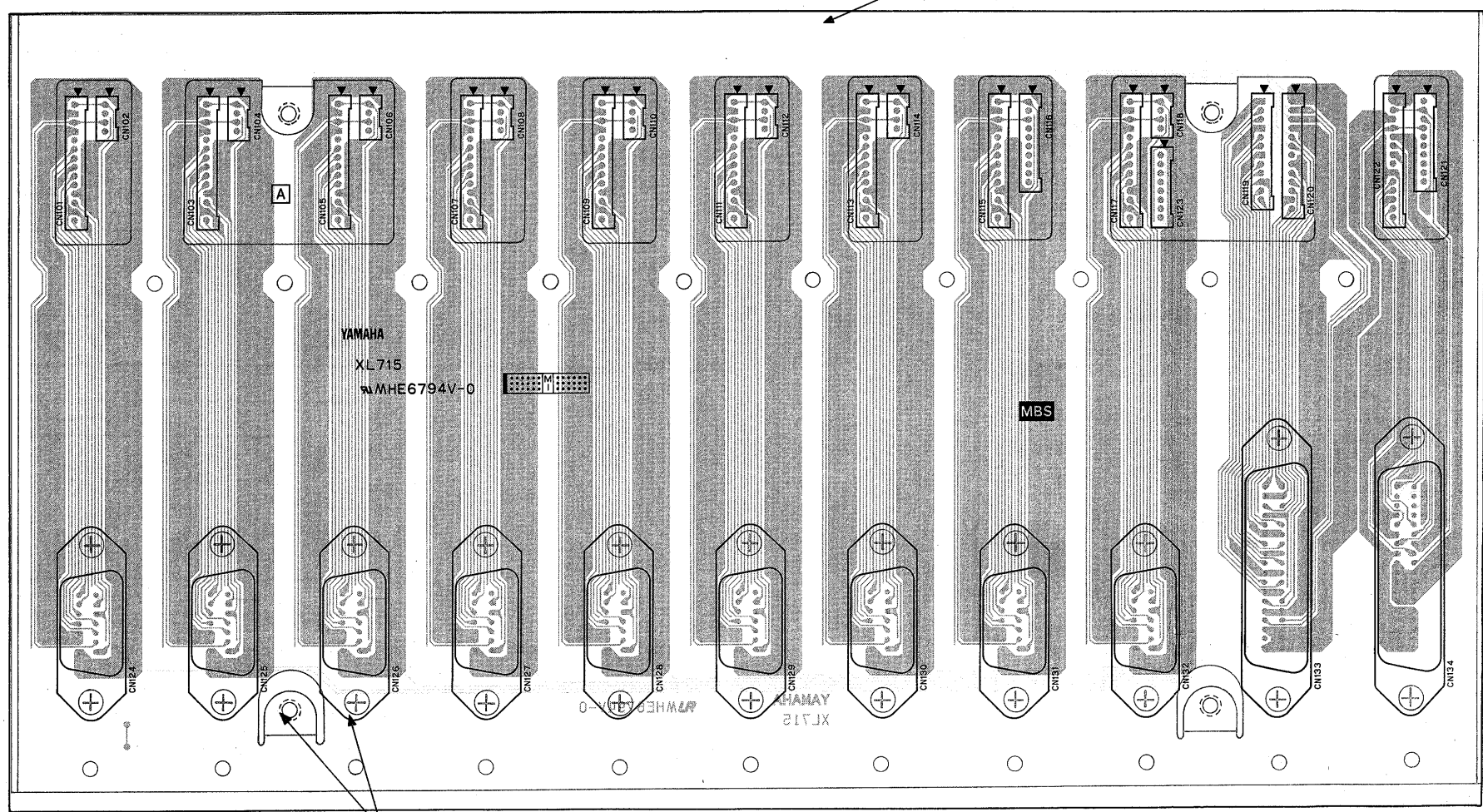
CONNECTORS (MBS, MBB)

Bus Connector Assembly

PM4000M-36: VN478700
PM4000M-44: VN478500
PM4000M-52: VN478600



MBS Circuit Board

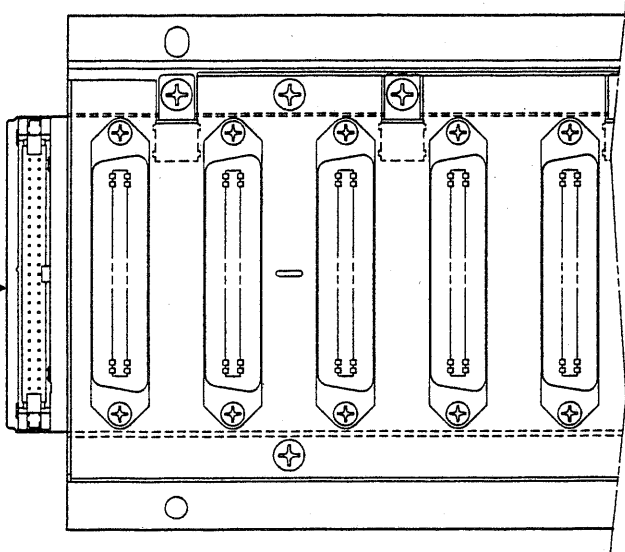


Flat head screw 3.0 x 6 ZMC2BL (EC030030)

Component side (部品側)

Bus Connector Assembly

PM4000M-44: VN478300
PM4000M-52: VN478500



Notes)

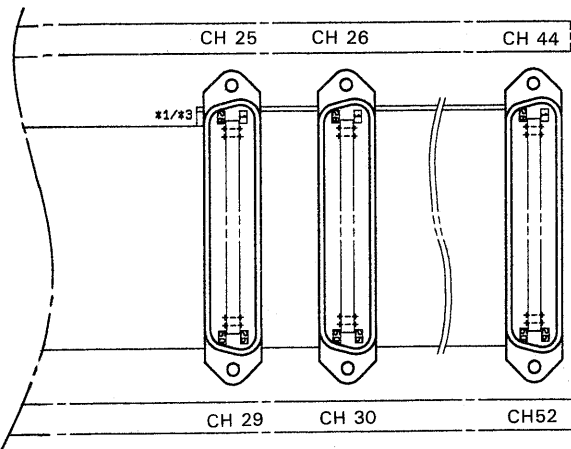
Circuit Board: MBS (VP508800) XL715A0

1. Connector
CN101, CN103, CN105, CN107, CN109, CN111, CN113, CN115, CN117, CN122, CN124, CN125, CN126, CN127, CN128, CN129, CN130, CN131, CN132, CN133, CN134: 14P TE (VA251900)
CN102, CN104, CN106, CN108, CN110, CN112, CN114, CN118: 36P TE (VN074400)
CN116, CN121: PH-4P TE (VB390000)
CN119: PH-10P TE (VB390600)
CN120: PH-12P TE (VB390800)
CN123: PH-13P TE (VF283100)
CN124, CN125, CN126, CN127, CN128, CN129, CN130, CN131, CN132: 14P TE (VA251900)
CN133, CN134: 36P TE (VN074400)

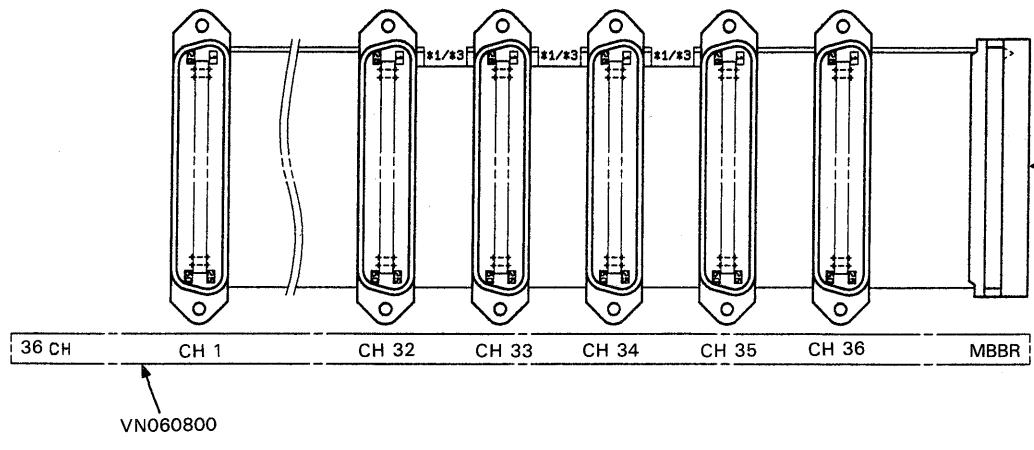
Notes)

Circuit Board: MBB (VP508700) XL714B0 (PM4000M-44/52)
MBBR (VQ246900) XL714B0 (PM4000M-36)

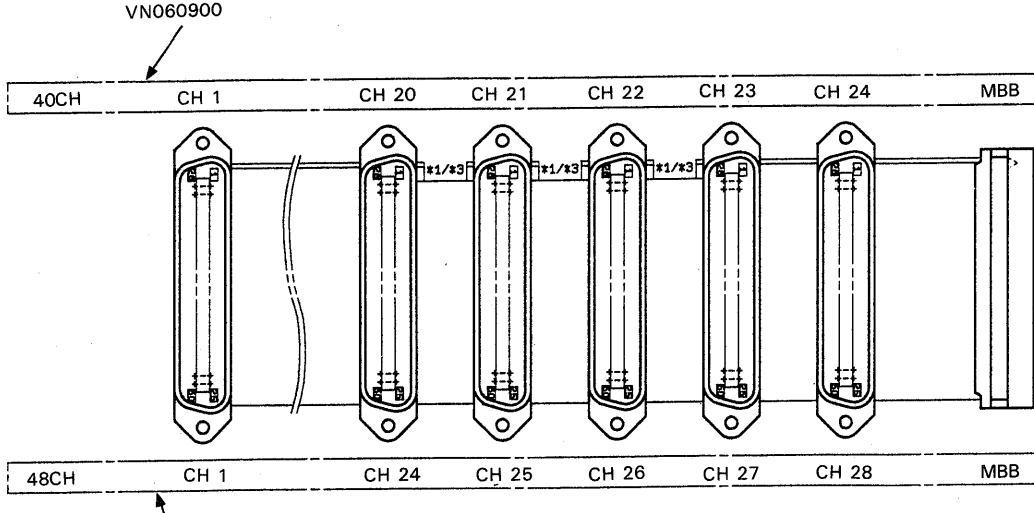
1. Flat Cable Assembly
CN101: HIF50P-HIF50P (VN47800) MBBL
CN120: HIF50P-HIF50P (VN47810) MBBR (PM4000M-44/52)
2. Connector
CN102: HIF3B8F50PA2.54 (VN318700)
CN103: VH-8P SE (LB933080)
CN104: VH-4P SE (LB933040)
CN105: PH-11P SE (VB389600)
CN106, N107: PH-8P SE (VB858700)
CN108, CN109, CN110, CN111, CN112, CN113, CN114, CN115, CN116, CN118: 50P TE (VA252000)
CN117, N119: 36P TE (VN074400)



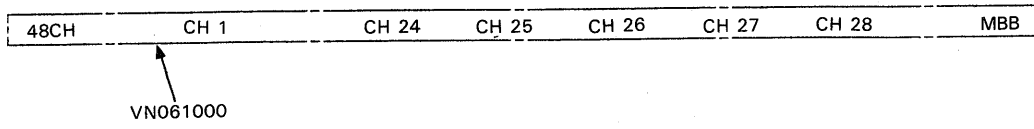
Flat Cable (F)



VN060800

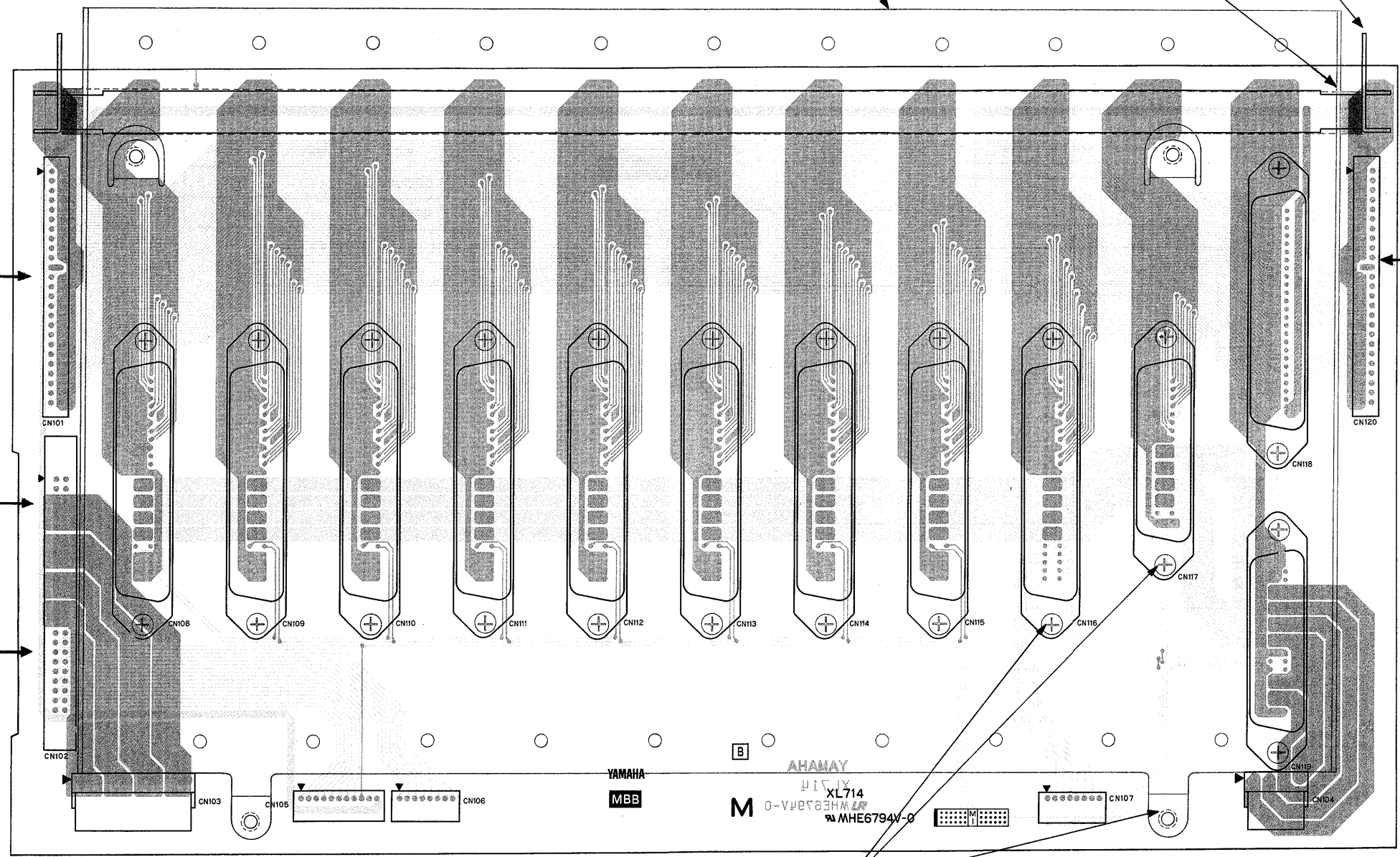


VN060900



VN061000

MBB Circuit Board (PM4000M-32: MBBR, PM4000M-44, PM4000M-52: MBB)



MB angle (F) (VP588800)

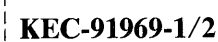
GND insulation sheet (VN046300)

GND angle (VN046100)

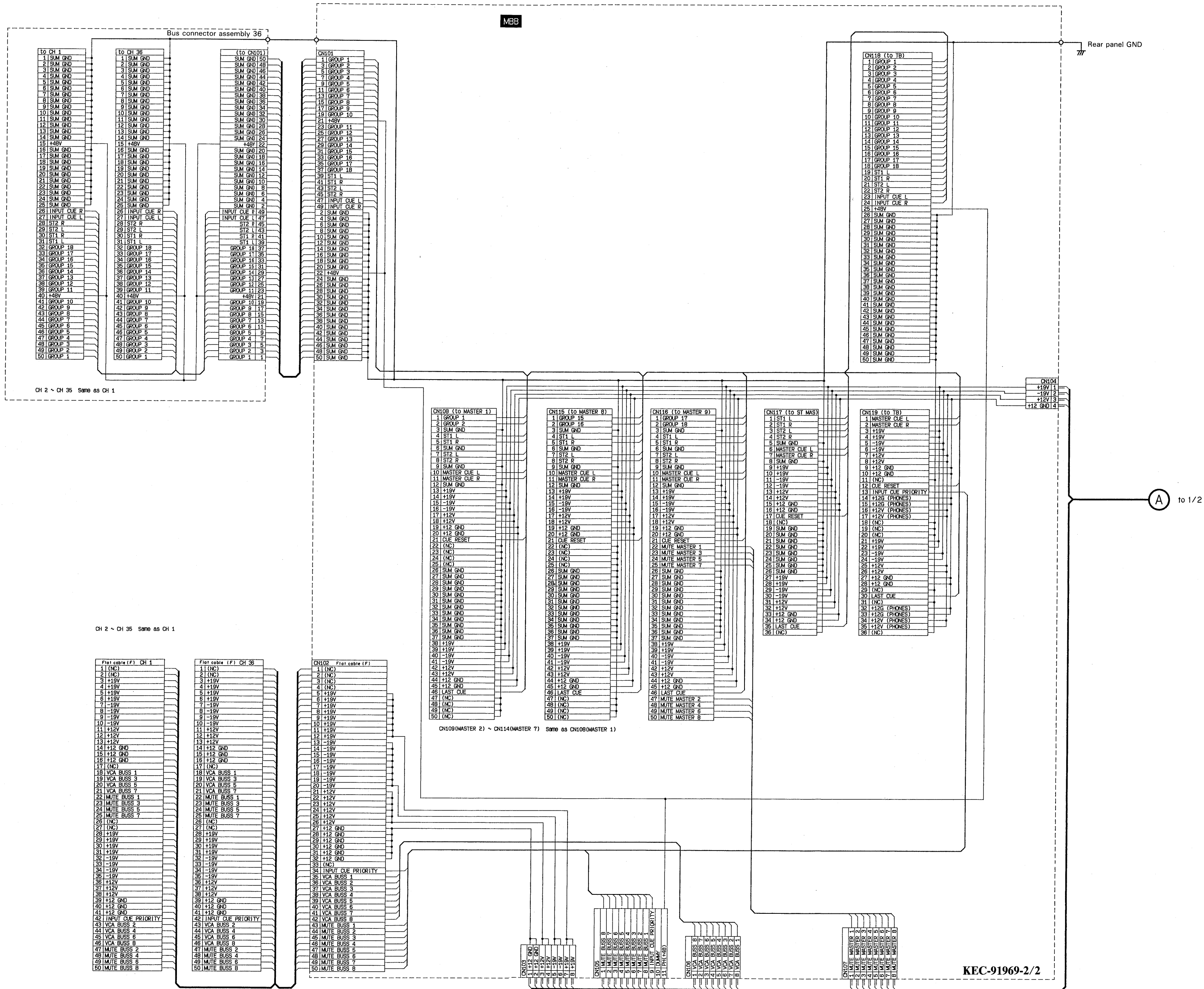
Flat head screw 3.0 x 6 ZMC2BL (EC030030)

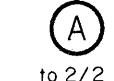
Component side (部品側)

3NA-VP50880 : MBS
3NA-VP50870 : MBBR, MBB



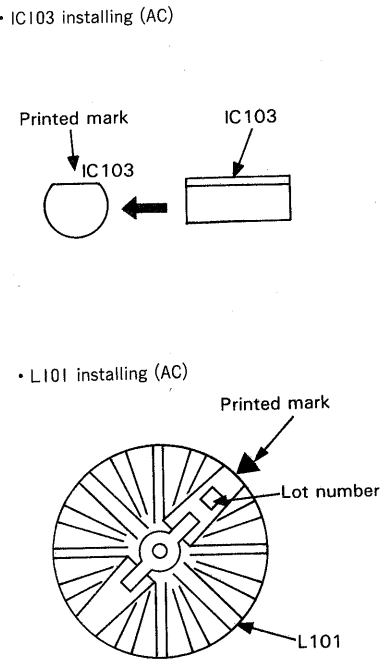
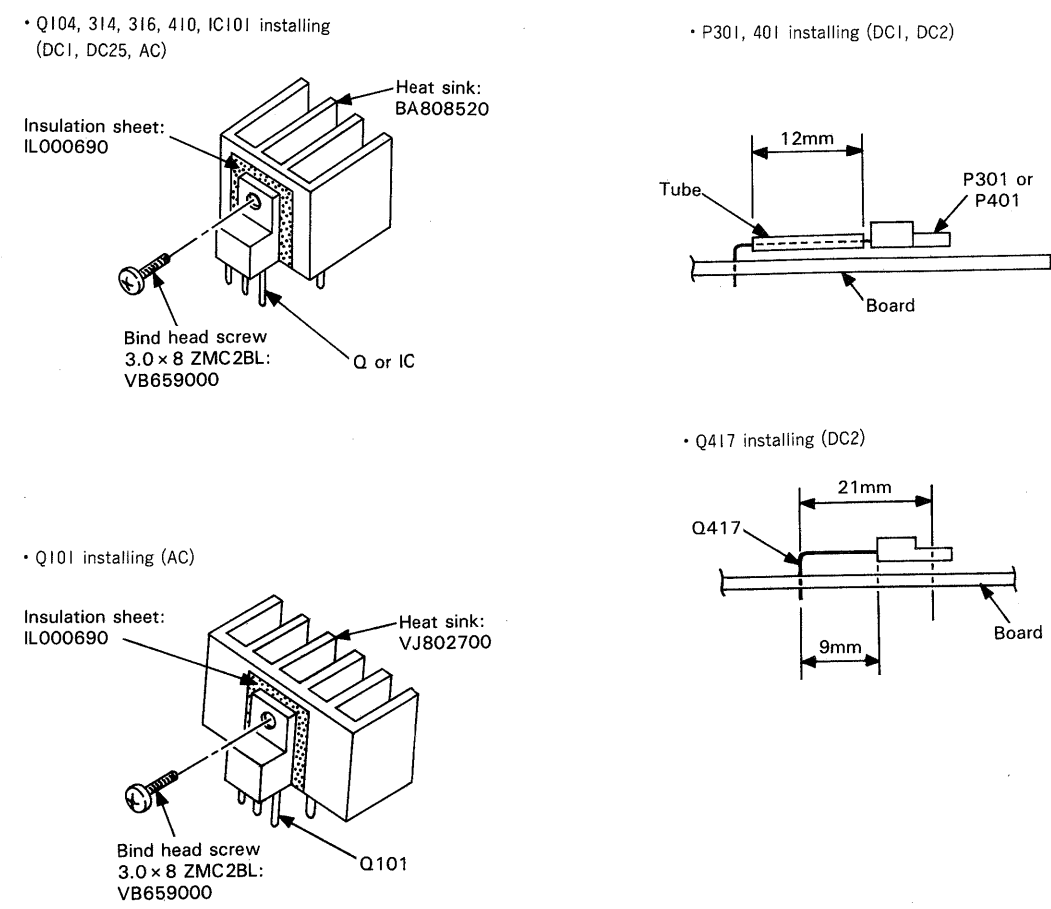
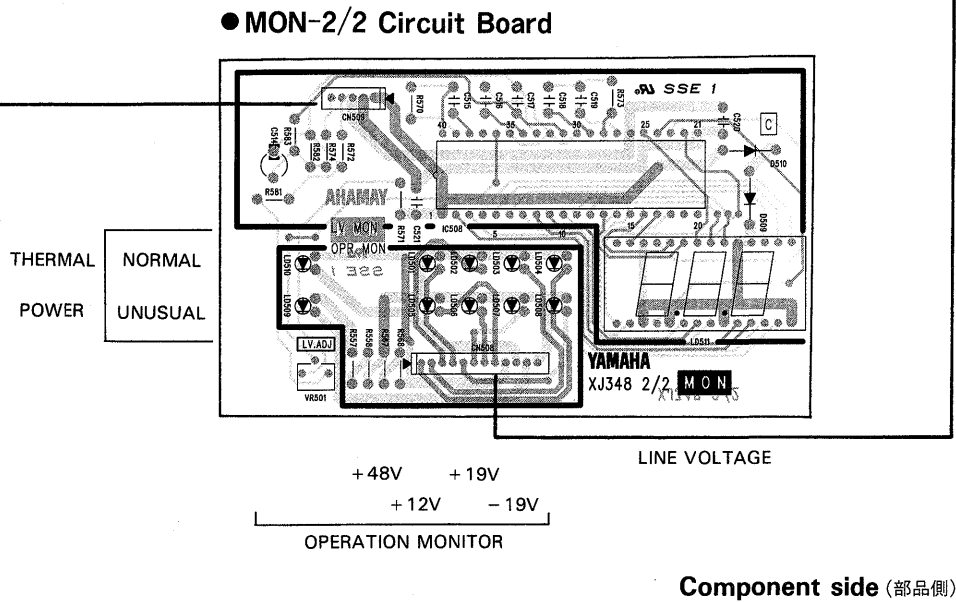
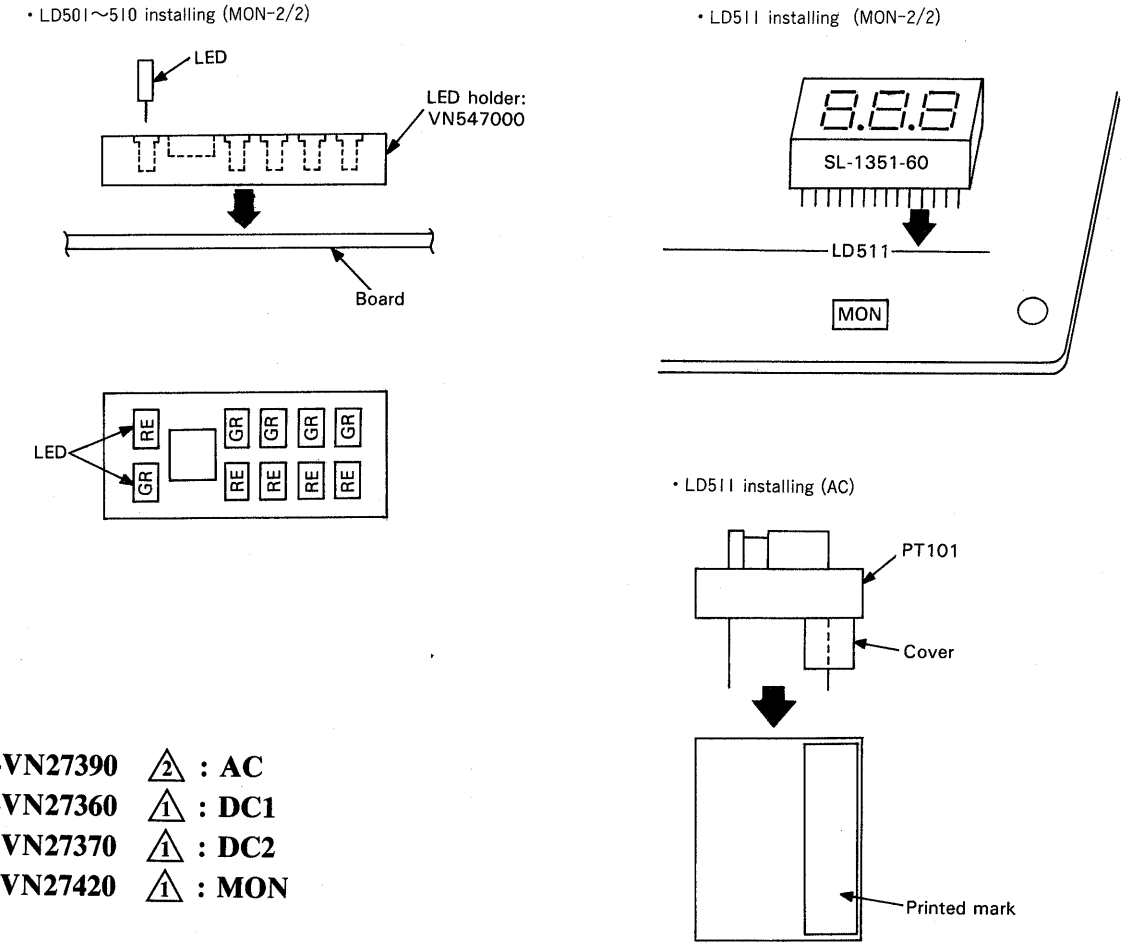
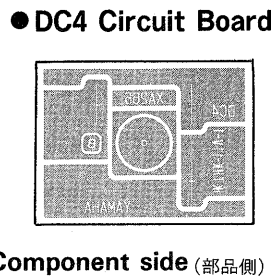
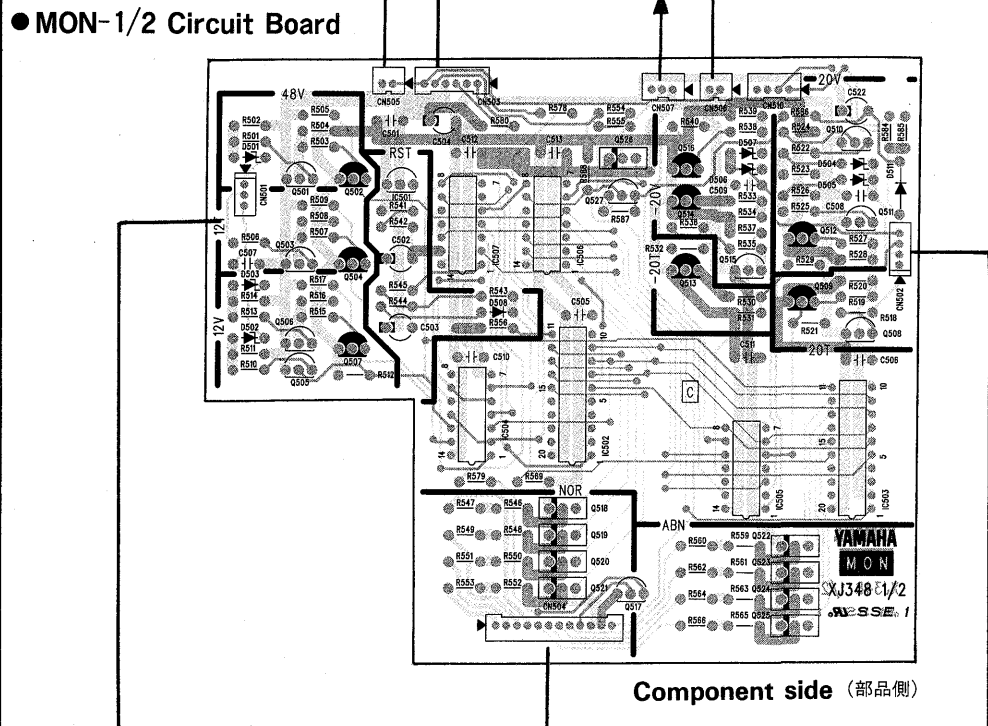
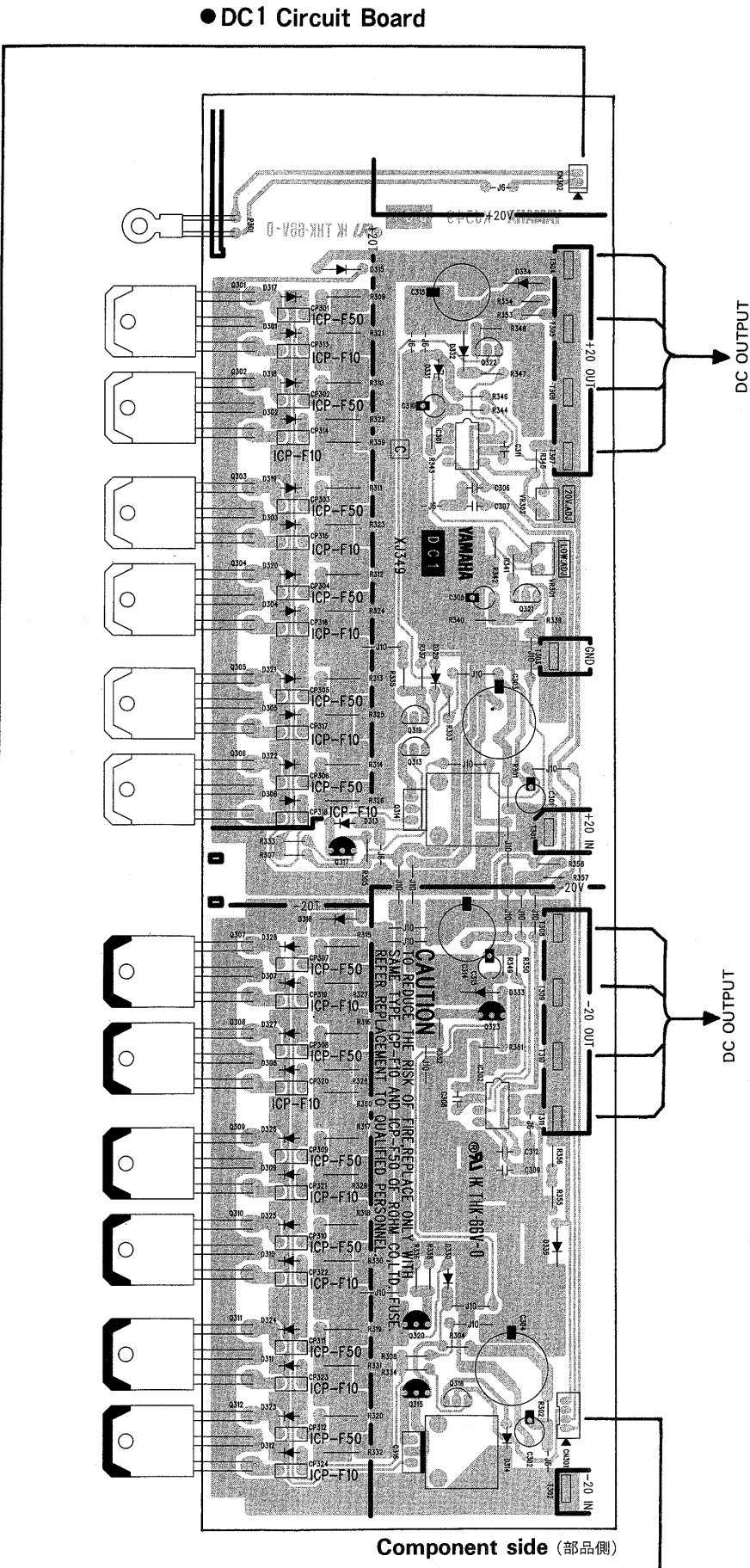
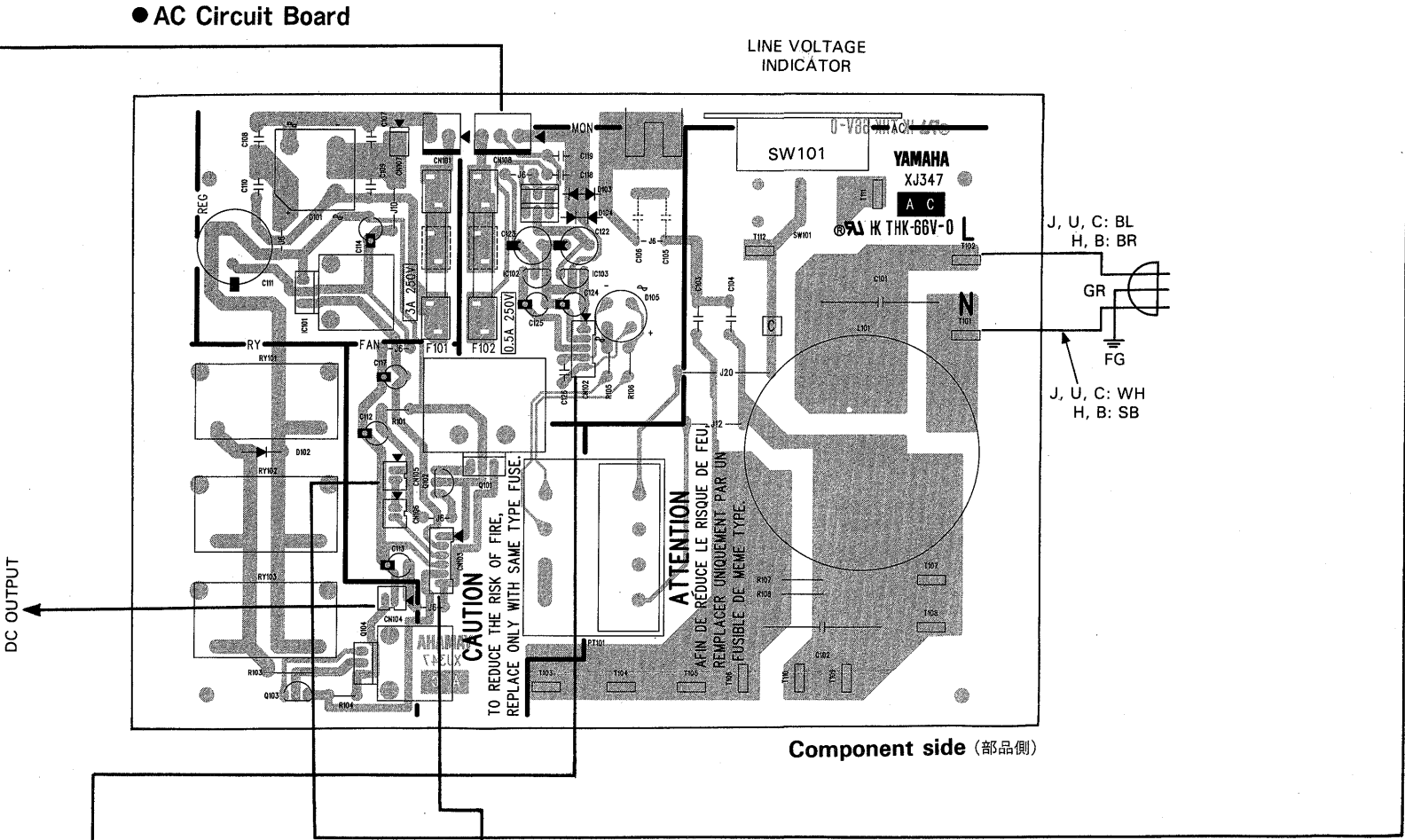
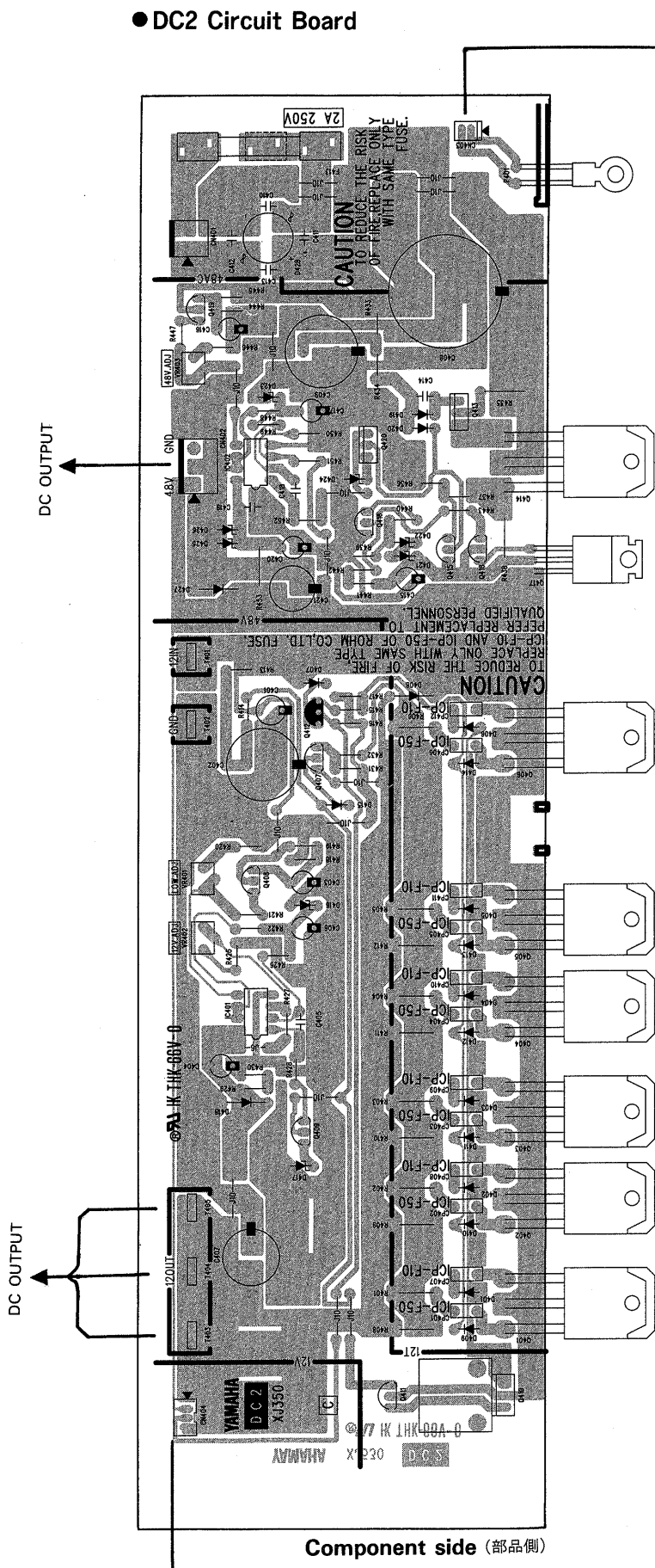
PM4000M-36 CONNECTOR CONNECTION 2/2 (MBB)





4





- 3NA-VN27390 : AC
- 3NA-VN27360 : DC1
- 3NA-VN27370 : DC2
- 3NA-VN27420 : MON

2

3

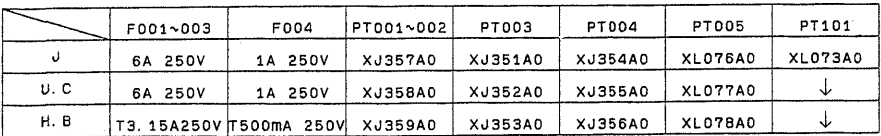
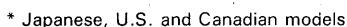
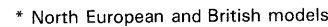
4

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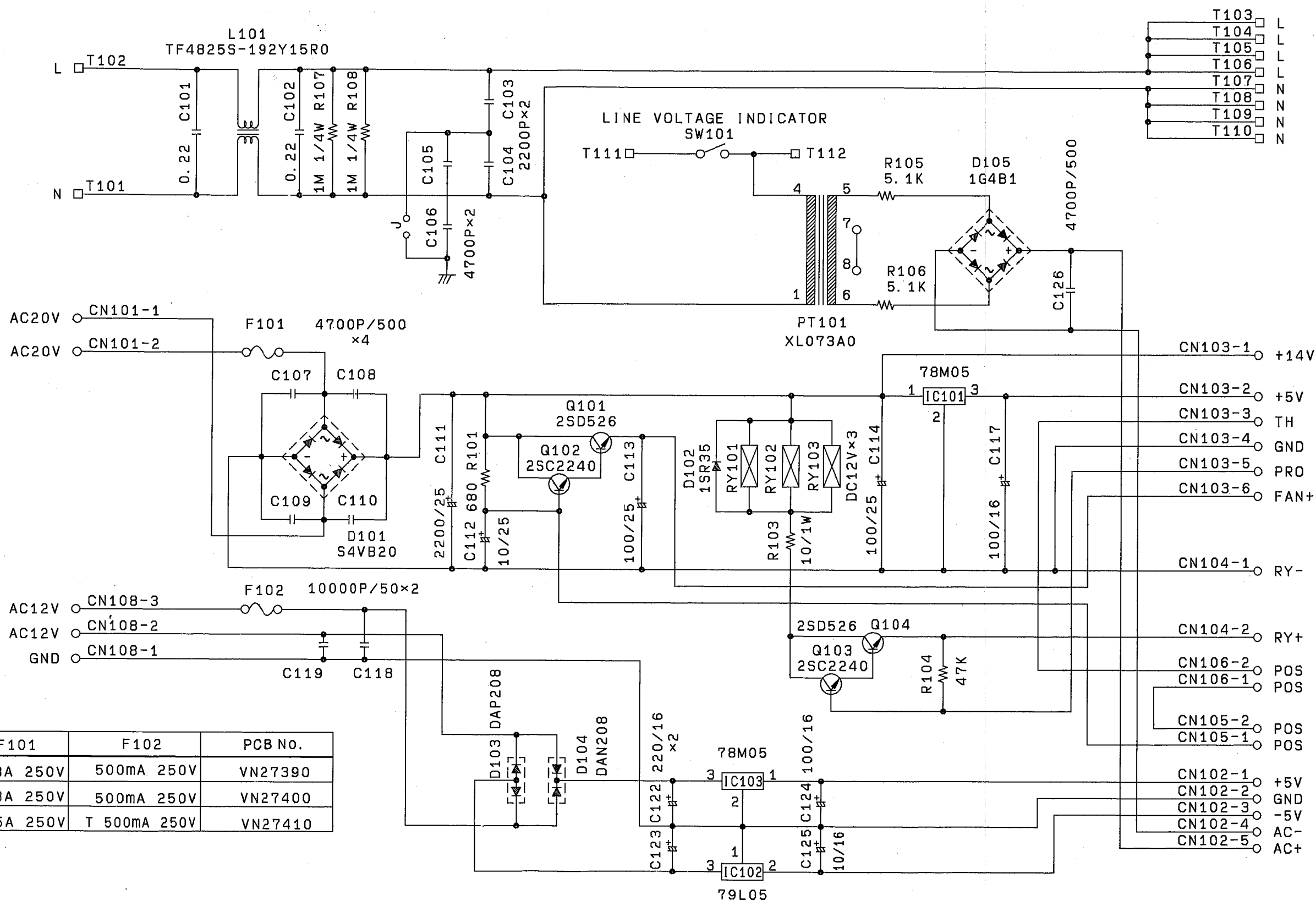


5

PM4000M/PW4000

AC CIRCUIT DIAGRAM

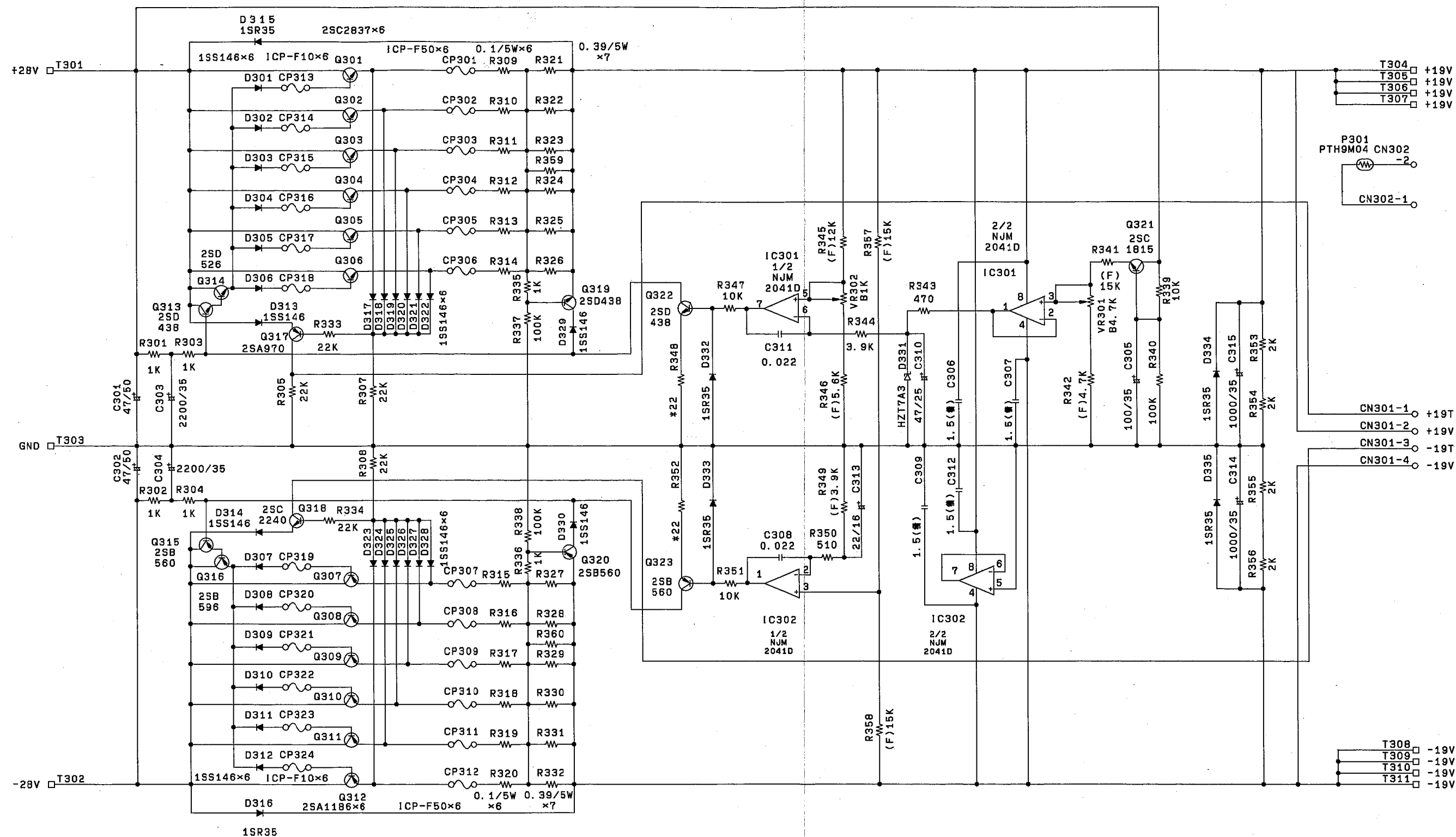
PM4000M/PW4000



KEC-91901

AC CIRCUIT DIAGRAM C31

■ DC1 CIRCUIT DIAGRAM



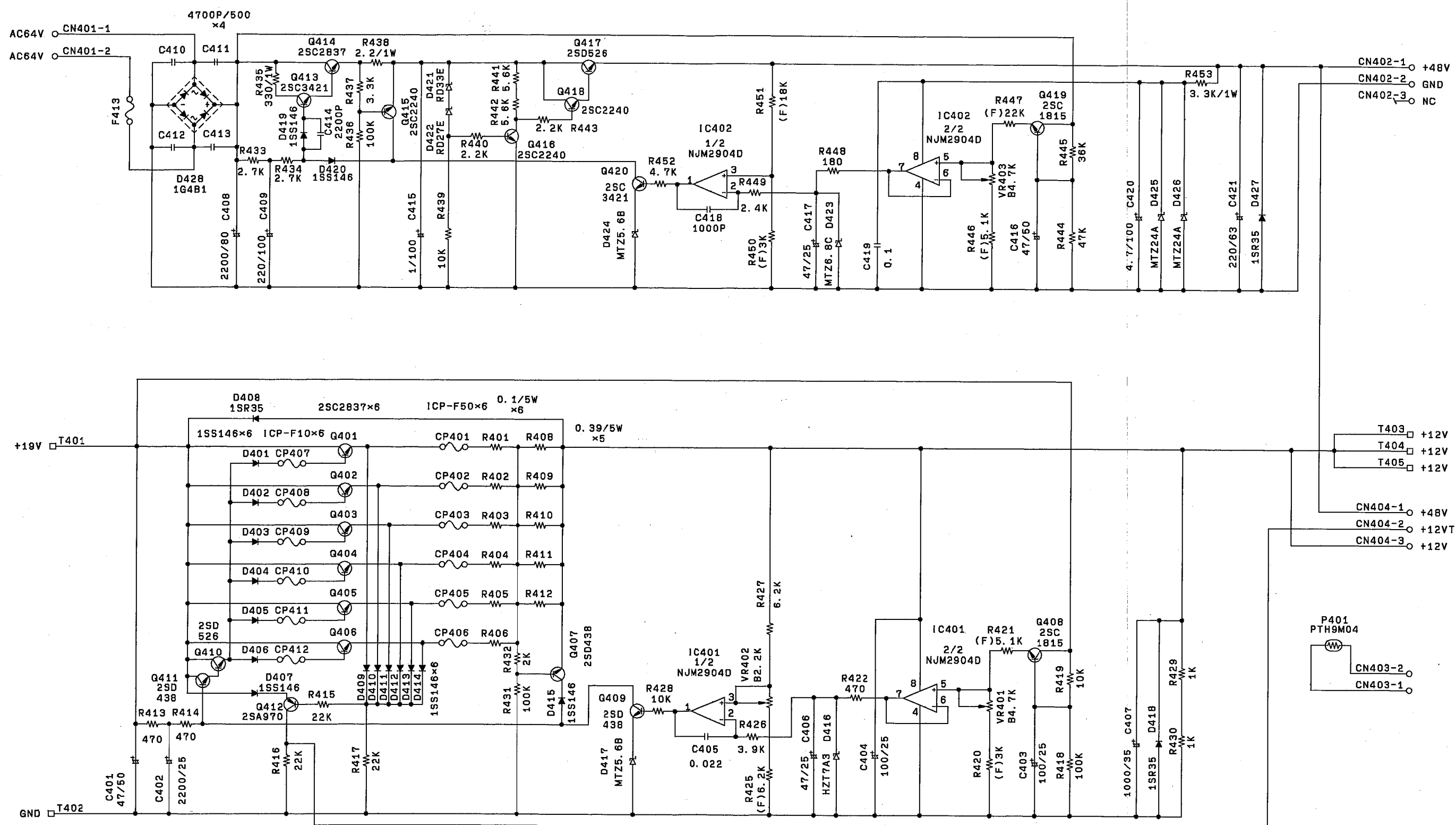
NOTE 1) Δ (積) : Monolithic ceramic cap.
C308, 312 : Ceramic cap.

NOTE 2) * : Flame proof carbon resistor
(F) : Metal film resistor
/5W : wire wound resistor

KEC-91902 Δ

■ DC1 CIRCUIT DIAGRAM

■ DC2 CIRCUIT DIAGRAM



NOTE 1)

	J	U. C	H. B
F413	 2A 250V	 2A 250V	 T 2A 250V
PCB	VN27370	VN36600	VN27380

NOTE 2)

(F) : Metal film resistor
/5W : wire wound resistor
/1W : Metal film resistor

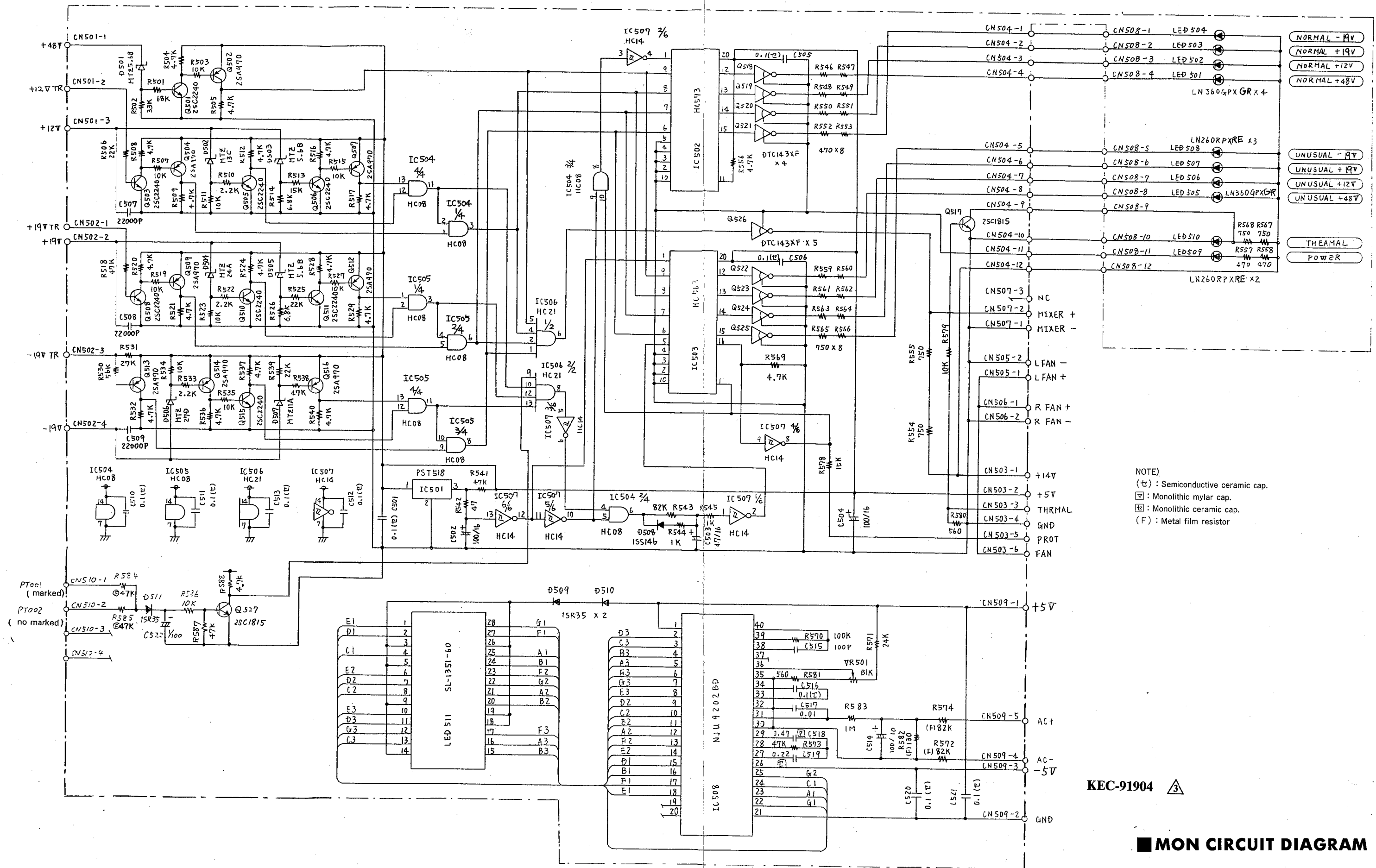
NOTE 3)

(τ) : Semiconductive ceramic cap.
C405 : Ceramic cap.

KEC-91903

△

MON CIRCUIT DIAGRAM



KEC-91904

MON CIRCUIT DIAGRAM